# Professor Cyborg Has Chip Implant in Research Project

Strange things are happening in the Department of Cybernetics at the Reading University in the UK. As Professor Kevin Warwick walks into the building doors open automatically for him, lights come on and his computer is switched on and greets him with a recorded message - but there is no visible means of activation like a Smart Card or a tag.
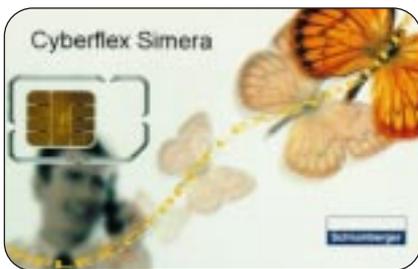
The Professor claims to be the world's first cyborg -part man, part machine - because of a silicon chip implanted in his arm. When a radio frequency signal is transmitted to the transponder, the coil generates the current which activates the chip. This then transmits a unique code identifying the individual to the computers in the department's network.
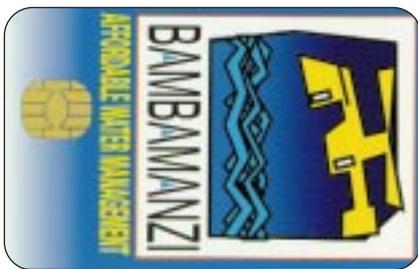
September 1998

News

Smart Card Tutorial

Main Photographs
Silicon Chip Transponder, shown to scale
[Reading University]

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Cyborg Project at Reading

In a glimpse of a Big Brother future, Professor Warwick's secretary, Mrs Liz Lucas, can now always find him by looking at screens which display his whereabouts in the building. "It was often very hard to find Professor Warwick when he had a telephone call or a meeting, but since the implant we always know where he is," she said.

Kevin Warwick is Professor of Cybernetics and carries out research in artificial intelligence, control and robotics. His favourite topic is pushing back the frontiers of machine intelligence. The implant is intended to dramatise the application of information technology to the operation of buildings.

The potential of the technology is enormous. For example it is possible for an implant to replace a bank payment card, provide data on an individual such as National Insurance number, blood type, medical problems, qualifications and criminal convictions. Individuals could be clocked in and out of their office automatically and it would be known where an individual was within a building and whom they were with. An implant could also be used for car security so that unless the vehicle recognised the unique signal from its owner it would remain disabled.

SCN could add a few more applications like keeping track of paedophiles who have served sentences but are still considered dangerous, locating lost or abducted children and elderly people who stray from home. Whatever the advantages, it all smacks too much of Big Brother for the technology to be widely adopted.

For the record, Professor Warwick underwent the operation to surgically implant a silicon chip transponder in his forearm on 24 August 1998. The operation was carried out by Dr George Boulos at his surgery in Reading, using local anaesthetic. The transponder consists of a glass capsule 23mm long and 3mm in diameter, which contains an electromagnetic coil and a number of silicon chips.

Professor Warwick says he will not keep the chip in his arm indefinitely.

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Scotiabank Visa Cash Card

Scotiabank and Visa Canada have announced that they are launching a multi-purpose chip card for Georgian College students at the Barrie, Orillia and Owen Sound campuses.

Students will be the able to use the new Scotiabank Visa Cash chip card for identification purposes, buy meals, purchase school supplies, access the school library and to shop in Barrie.

The launch of the student chip card coincides with Scotiabank and Visa Canada's decision to continue the consumer trial of the Visa Cash card in Barrie where nearly one third of the population owns a card which can be used for shopping, dining out and using the transit system. "The consumer trial in Barrie has exceeded our expectations," said Bob Lounsbury, Senior Vice President of Card Products and Marketing for Scotiabank. "Over 25,000 people have picked up a Visa Cash card that they can use to buy goods and services at some 400 retailers around the city. We are excited that we are expanding the program to introduce the first multi-purpose chip card of its kind for students in Canada."

The Scotiabank Visa Cash card has been used on the Barrie transit system since last May and now students will be able to use their cards on the buses.

George Kaveckas, Barrie's Traffic, Transit and Parking Manager, said: "We anticipate saving as much as $100,000 annually by replacing the need to handle cash, tickets and passes."

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Healthcare Cards for France

De La Rue Card Systems is supplying the French Vitale healthcare scheme with 100,000 CPS health professional cards which enable authorised medical practioners to read and amend patients files by inserting the card into a PC-connected reader. De La Rue is also supplying its PE 135 card readers.

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Facial Recognition on a Card

Technology for a new generation of credit and security cards using facial recognition has been unveiled by a research team at Kent University in the UK.

They have developed a system for storing digital photographs in magnetic stripe and Smart Cards to enable rapid visual identification at ATMs, points-of-sale and access control areas.

According to the researchers, the new technology eliminates the need for PIN numbers and passwords. Checkout operators will be able to compare a photograph on the customer's credit/debit card with one on a central system. At ATMs and computer terminals, a camera would scan the user's face and match it with the image stored on their card. The technology could also be used for identifying entrants to a building, sports stadium or office.

Each photograph is a composite of stored "control" faces. This effectively allows a facial code to be stored, for example, on a single track of a card's magnetic strip.

Dr Chris Solomon, who heads the research team, is employing MATLAB software from Cambridge Control, to generate the programming code which is central to the project. MATLAB is a complex data analysis tool which automates many of the steps in the creation of code. It accelerates the design process for compressing images so they can be stored in a Smart Card.

"With such a large amount of research and programming going into this project, it was important that we did not spend time unnecessarily," said Dr Solomon.

"By using MATLAB we estimate we have managed to reduce the time needed to create programming code by about 80%. This has allowed us to concentrate on the main focus of our research."

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Schlumberger 16K Java Card

Schlumberger Smart Cards & Terminals has announced it is now shipping the most powerful new member in its Cyberflex family of Smart Cards - Cyberflex Open 16K, based on Java technology.

The new card doubles the amount of memory available for application software substantially increasing the number and size of Cardlets that can be stored on the card. It is compliant with the Java Card 2.0 Application Programming Interface (API) specification and a PC/SC interface provides interoperability on the host PC. This means that Smart Card aware software can be written for the PC using the Microsoft Smart Card SDK for Windows 95, 98 or NT. PC/SC compliance also brings compatibility with a variety of Smart Card readers. Cyberflex Development Kits can be purchased over the Internet at the Schlumberger Smart Card Marketplace www.cardstore.slb.com. An upgrade kit for the Open 16K version is also available.

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Teach-in for Business Leaders

The Smart Card Forum (SCF), a multi-industry organisation working to accelerate the widespread acceptance of Smart Card technology, will hold its latest course designed to introduce business leaders to the basics of Smart Card technology and business applications in conjunction with its 6th annual meeting next month in San Francisco. The course on 8 September is designed to enable newcomers to:

- describe the basics of Smart Card technology
- explain the business case
- understand current consumer and merchant demand and issues related to Smart Card applications
- describe characteristics of today's marketplace that illustrate the importance of Smart Card use
- recognise and discuss issues surrounding security, fraud and privacy.

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Call for Industry Co-operation

A call for the Smart Card industry in Australia to work together on common standards and interoperability rather than just on individual commercial interests, has been made by Ms Janet Sayer of Telstra Payphone & Card Services.

"There is a major challenge before the Smart Card industry in Australia and this is to avoid the mistakes of the past where several versions of the universally applicable technology have been thoughtlessly foisted on consumers and retailers, causing inconvenience, confusion and high cost," she told delegates at the Cards Australia '98 conference in Sydney last month.

Ms Sayer cited the simultaneous introduction of BETA and VHS systems as well as the multiple EFTPOS technologies which competed against each other, as instances when industry had not worked together, causing inconvenience and unnecessary costs for retailers and consumers.

She said it would be difficult to persuade retailers to support a proliferation of systems and therefore the industry needs to address this matter now as a matter of urgency.

"It is vital that the industry as a whole pulls together to work on common standards and interoperability for Smart Cards, rather than just on individual commercial interests," she said.

Telstra announced, that its Smart Card roll-out has been an unqualified success, with over 10 million Smart phonecards sold in the 11 months to July. The Telstra Smart Phonecard is the only Smart Card to be rolled out nationally in Australia to date. Much of its success is attributable to consumer familiarity with the Telstra phonecard product and the existing relationship that Telstra has with over 12,000 retail outlets which sell the phonecards. Ms Sayer said that over the past twelve months the Telstra Smart phonecard has been used successfully for a range of payments at major events such as the Asia Pacific Scout Jamboree and the Sydney Royal Easter Show.

Reloadable Telstra Smart Cards have also been issued at three Australian educational establishments in place of student cards. These Smart Cards provide students with photo ID, library privileges, building access and memberships. (See SCN March 98, page 54.)

"We have been delighted by the take up of the new technology," said Ms Sayer. "More than 10% of purchases through a soft drink vending machine in Adelaide were being paid for with our cards, even before we undertook any promotion to advertise multiple vending with Telstra Smart Phonecards. This shows an excellent understanding and adoption of the benefits of Smart Card technology," she said.

Ms Sayer emphasised that Telstra is keen to work with the industry in general to develop further Smart Card applications.

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Visa Joins GCA

Visa International has joined the Global Chipcard Alliance (GCA) adding its backing to other Smart Card leaders from the areas of finance, telecommunications and technology in promoting an open infrastructure for chip cards and global interoperability for multiple application Smart Cards.

David Anastasi, President of the GCA, said: "Visa's decision to join the GCA demonstrates broad cross-industry support essential in providing an open global environment where Smart Card advancement can flourish."

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New Terminal from VeriFone

VeriFone has announced the introduction of the OMNI 1460 payment terminal with an integrated Smart Card reader, magnetic stripe reader, electronic signature capture capability and PIN pad. The company says the terminal is designed to support worldwide credit/debit and Smart Card security schemes and provides an easy upgrade path for loyalty and stored value card transactions.

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Bull Neng Card for China

Bull has announced the Neng payment card, designed for the Chinese banking industry in response to the People's Bank of China's (PBOC) specification for a nationwide chip-card interoperability standard.

The Neng card was introduced in China in June 1998. Bull was the first supplier worldwide to sign a contract for the new-specifications payment card with a Chinese bank, namely the Shanghai Pudong Development Bank (PDB).

M. Sun Fuji, Director of the IT department at the Shanghai Pudong Development Bank, commented: "Along with Bull, the PDB has helped define the specifications of the new national payment card. Now, Bull and the PDB are taking the lead in launching pilot sites that use the Neng card."

The Neng card is part of Bull's SmartPay global payment system. This system, based on a chip card, was marketed in China in 1994 in response to project Golden Card, launched by the Ministry of Electronics and Industry, and PBOC. SmartPay includes an IC card, back-office systems, EFTPOS terminals and Automatic Teller Machines (ATMs). SmartPay is used by the Shanghai Pudong Development Bank, the Shenzhen City Union Bank and Hifinet, a network of banks in the province of Hainan.

"The Neng card will allow Bull to reassert its leading position in China, as the company already holds 70% of the market with its TB100 payment cards," said David Levy, General Manager of Bull Smart Cards & Terminals. "All of our clients equipped with the SmartPay system will be able to migrate easily to the national standard."

Launched in September 1994, project Golden Card was designed to develop a modern national payment system to reduce cash transactions, follow currency trends, promote and develop the Chinese electronics industry, and establish a chip card standard.

The Neng card offers all the features required by PBOC (electronic deposit and electronic purse), and many more. With the 'electronic deposit' application, cardholders can credit or debit money on their card, pay for purchases using POS terminals, withdraw money from ATMs or simply check account balances.

A PIN code provides the security needed and allows cardholder authentication while the e-purse enables quick payment of small sums without the use of the PIN code. The Neng card meets the EMV (Europay-MasterCard-VISA) standard.

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VeriSign/Gemplus Strategy

Gemplus and VeriSign, Inc are expanding their strategic relationship to target enterprises looking to secure on-line communications and commerce over the Internet and private IP networks. In the initial phase, Gemplus has chosen to bundle VeriSign's Digital IDs with GemSAFE, Gemplus' Smart Card-based solution for securing network transactions.

GemSAFE is a secure and portable, Smart Card-based solution for accessing corporate intranets, web sites, and e-mail systems. It consists of a Gemplus Smart Card, a reader, software (including Microsoft Corporation and Netscape Corporation browser suites), and a voucher for a VeriSign Digital ID.

While GemSAFE is compatible with any x.509 certificate, Gemplus has selected VeriSign's Digital ID for GemSAFE users to download onto their Smart Card. Users only need to visit the GemSAFE web site (www.gemplus.com/gemsafe) and follow the instructions to load and authenticate the card at no additional cost.

Digital certificates allow individuals to digitally sign and encrypt messages so that only the intended recipient can read the message and have the piece of mind that the message has not been altered en route, either intentionally or by accident.

Rather than storing the certificate on the user's PC, GemSAFE makes it possible for authorised individuals to easily and securely access corporate information from any GemSAFE-equipped computer.

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Norway Buys Mondex Franchise

Posten SDS, the high tech subsidiary of the Norwegian state postal organisation has announced the purchase of the franchise rights for Mondex electronic cash in Norway. It has been joined in the franchise by Telenor Conax, a subsidiary of the Norwegian state telecommunications company.

Posten plans to use the MULTOS multi-application operating system and the first applications, to be rolled-out early next year, will by a national identity card (Norwegian population 4.5 million) with Mondex electronic cash on the same card. It is also planned to add emergency health data to the card and Posten says it is also looking at loyalty applications while Telenor has said it plans to develop the Mondex platform for pay-TV and electronic commerce.

The acquisition of the Mondex franchise is seen as the first step towards establishing a new electronic infrastructure based on Smart Cards for the entire Nordic region. While Sweden has the CASH electronic purse, Denmark its DANMØNT purse and Finland the Avant card, they are national schemes which do not interoperate and Norway intends to extend Mondex into these countries.

Owain Powell-Jones, Director of Commercial Development (Norway), said: "We see Mondex as a template for Europe. With the MULTOS operating system, Mondex is a multi-application, multi-currency, including the Euro, Smart Card providing interoperability across borders. He told SCN that he expected the banks, which are also state-owned, to join in later and there would be further announcements relating to major commercial and financial organisations joining the initiative.

Per Andersen, Chief Executive, Posten SDS, said: "Posten SDS is already a major supplier of services to the government and private sector. The introduction of Mondex in Norway will enable us to provide more efficient electronic services to our customers and will provide us with an opportunity to enter new markets. The deal is a breakthrough for e-commerce in the Nordic region."

Telenor Conax is a market leader for electronic commerce and pay-TV systems using Smart Cards and cryptography. Chief Executive Oystein Larsen commented: "The combination of unique functionality and security offered by Mondex and MULTOS gives us exactly what we need. Quite simply, Mondex electronic cash is the most attractive product available to create e-commerce solutions for our clients." It is also an important breakthrough for Mondex International not only in selling its first Mondex franchise in mainland Europe but in penetrating a region noted for its rapid adoption of technology evidenced, for example, in the very high take up of GSM mobile phones.

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Proton Card is Euro Ready

Proton World International (PWI) has announced that existing Proton cards denominated in a national currency have been successfully converted into Euro and performed Euro payment transactions in an operational environment.

Armand Linkens, PWI's Managing Director, used his Proton card to make a payment in BEF, then converted on-line into Euro on an ATM and then made a payment in Euro on a Proton terminal (displaying amounts in BEF and Euro to familiarise consumers with the forthcoming currency).

"Making low-value payment in Euro with Proton is convenient and fast, " he said, "and it facilitates the introduction of the Euro into our daily lives."

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Internet Growth in US and Canada

Internet users over the age of 16 in the US and Canada now total 79 million while the number of people buying products and services via the Web has hit 20 million, according to a new study on Internet commerce by Nielsen Media Research and CommerceNet.

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Siemens New Cryptocontroller

Siemens Semiconductors has begun volume shipment of its new 16-bit cryptocontroller for multi-application, high security Smart Card applications.

The SLE66CX160S makes it easier to implement different high-security applications alongside each other on the same card, for example access control for public transport, such as a rail season ticket, with a financial application like a bank debit card. It is also targeted at mobile communications, healthcare and pay-TV where security is important.

"The Siemens SLE66CX160S cryptocontroller has the largest memory capacity of any chip card controller currently available, on an extremely small chip surface of less than 20 mm^2," said Dr J_rgen Kattruff, Head of Marketing for Security and Chip Card ICs at Siemens Semiconductors.

The memory capacities of the SLE66CX160S provide up to 32K bytes EEPROM, 32K bytes ROM and 1.2K bytes of RAM.

"This chip provides a platform for the launch of genuine multi-application cards," said Kattruff. "Its processing power and flexibility means that several service providers can offer their services on the same chip card."

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FANCash Cards for Panthers Fans

NationsBank is issuing FANCash Smart Cards for Carolina Panthers fans to purchase drinks, food and merchandise at Ericsson Stadium.

Involved in the scheme are NationsBank, Precis Smart Card Systems which is supplying its PrecisCache Smart Card system, Schlumberger Smart Cards & Terminals and VeriFone.

The 1998 FANCash cards are preloaded with $10, $20, $25. $50 or $100 and feature six designs..

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France Telecom Contract for ODS

German Smart Card manufacturer, ODS, part of Landis & Gyr Communications, has won a major contract from France Telecom to supply high volumes of microchip phonecards in a deal worth more than FF50 million over a three-year period.

This is the first time France Telecom has awarded a contract of this type to a company based outside France - in spite of strong competition from French chip card manufacturers.

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Hypercom T5000 Terminal

Hypercom has introduced its electronic point-of-sale payment terminal T5000 to the European region. It supports a range of value-added transactions, including loyalty and Smart Card schemes such as Visa Cash, Mondex and the EMV specifications.

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People on The Move

Douglas C Rattray has been appointed as President of Card Technology Corporation, a subsidiary of NBS Technologies. He is the former Chief Executive Officer and Chairman for Brandt, Inc.

De La Rue has appointed **Ian Much**, former Chief Executive of T&N, as its new Chief Executive.

Goh Hock has been appointed President of Schlumberger Test & Transactions Asia in Beijing, China. He joined Schlumberger over 18 years ago and held management positions in more than 10 countries. He replaces Jack Liu who has moved on to new responsibilities with Schlumberger Ltd.

Ian Harley has been elected as Chairman of the Council of APACS, the Association for Payment Clearing Services. The Chief Executive of Abbey National, he takes over from Richard Orgill, Deputy Chief Executive of Midland Bank who has held the non-executive post since July 1995.

US Navy Multiple Application Card

In conjunction with the US Navy, 3-G International (3GI) has developed and implemented a multiple application Smart Card program for the US Navy Recruit Training Command in Great Lakes, Illinois.

The system includes electronic cash, healthcare, dental and food service applications. 3GI says over 1,000 cards are being issued weekly and they expect to issue over 50,000 cards annually.

Product Technology Inc developed the electronic cash application and in the first month, the Navy Exchange in Great Lakes recorded over 13,000 Smart Card purse transactions totalling over US $400,000 with each sale averaging just over US $30.

Thomas R Kolstad, General Manager of the Navy Exchange said: "The system saves tremendous Navy Exchange resources by eliminating the collection, management and handling of cash and the paper-based "chit" system of vouchers used for purchases on the base." The card also automates medical and dental data management and record keeping through Smart Card applications developed by 3GI.

The Great Lakes Smart Card is only used during the recruits' nine-week training period. On completion of training, 3GI software writes the data from the card to a permanent Navy Smart Card which is personalised on the exterior with a photograph and demographic data prior to issue. The new card is now a secure, portable information carrier which travels with the recruits to their next command. The old card is then re-used.

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Lithuanian Bank Backs MULTOS

Bank Snoras of Lithuania will be one of the first implementors of the MULTOS secure multi-application operating system as it moves to upgrade its proprietary chip card system to make it EMV (Europay/MasterCard/Visa) compliant.

The bank has had a chip card electronic purse payment system for account holders since 1995, but is aiming to operate on an international scale.

Consumers will be issued with the ImparCard payment application (Bank Snoras Smart Card payment system), combined with Maestro debit and MasterCard card functionality. In agreement with MasterCard, De La Rue will supply 50,000 co-branded Smart Cards.

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Test Centre for China Card Project

People's Bank of China (PBOC) has chosen Schlumberger as its consulting partner to provide technical assistance, training and equipment to establish the Certification Centre for China's new nation-wide Smart payment card project. The new centre will be operated for the PBOC by the China Banking Card Switching Centre in Beijing and will be responsible for testing and certifying the cards and terminals supplied by vendors to the scheme, which will provide debit and electronic purse facilities in China. According to Schlumberger, the new Certification Centre will ensure interoperability and speed the roll-out of the biggest Smart bank card scheme in the world. Four international Smart Card companies and several Chinese suppliers are already involved in the project, and prototype cards and terminals have begun to be released.

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Gemplus Opens RFID Tag Division

Gemplus has opened a radio frequency identification technology (RFID) Tag division in Singapore to meet the needs of the growing market in the Asia-Pacific region. The company says it is already making agreements with nine Value Added Resellers (VARs) in the region and plans to manufacture Smart tags in Singapore by the first quarter of next year.
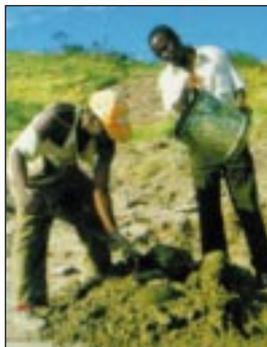
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Water For The People Project

Smart Card technology is helping in a Water For The People project in South Africa in a prepayment water supply system. Consumer acceptance has been high. In less than a year's trading in South Africa, there are over 60 projects in the field with over 10,000 prepayment metering units, 300,000 Smart Tokens, 150 EFT10 terminals with a current order placed for a further 150 terminals and 73 management information systems. Over 500,000 families have benefited from the system and over 300 jobs created.

Background

Bambamanzi, based in Durban, South Africa, was formed to develop the prepayment management system and holds the worldwide marketing and distribution rights for the system.

The original research by Bambamanzi determined that the system required a very robust token for transferring credit to the prepayment metering device.

The Dallas "Smart Token" was selected and encapsulated into plastic to produce a Smart Card look-alike. The Smart Token has been the key to the transfer of information to the prepayment metering unit in terms of credit and the transfer of usage information back to the Management Information System via the EFT10 vending terminal.

However, it was decided that the Smart Token did not meet the level of security required or provide for interoperability so the NET1 UEPS (Universal Electronic Payment System) technology utilising Smart Cards is being incorporated in the Prepaid Water Management System.

Bambamanzi now claims leadership in the water prepayment industry in Africa. It is now owned by

Logtech, a division of Conlog, the largest supplier of prepaid electricity meters with a 67% market share equivalent to more than two million meters.

The system comprises:

Consumer Smart Tokens which enable the consumer to buy water credit. It controls and monitors water usage and passes back management information on water consumption to local authorities and bulk suppliers via the management system.

Point-of-sale units - the vending device used to issue water credit to consumers and to record water usage.

Prepayment water meters (two types are available). The community standpipe is designed for use at communal water supply points where consumers use encrypted Smart Tokens to draw the amount of water they require - the meter water flow is activated until the user withdraws the token. The Yard Connection meter is designed for use at individual sites where the meter records the total amount of water credit available, and by storing this information allows the consumer to draw over a period of time the amount of water purchased until the credit expires. The Management Information System collects, processes and stores all information from the prepaid meters, vending units and bulk meters.

NET1 are systems integrators specialising in electronic purse applications in the financial sector. They pioneered and developed the UEPS which uses microprocessor Smart Cards with off-line point-of-sale terminals.
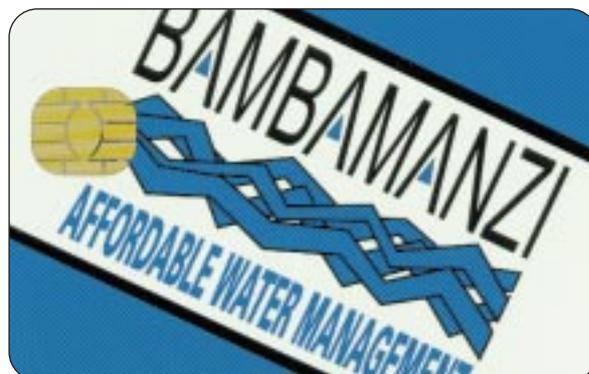
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Miledger Could Save Tax

Calculating business and private mileage on company cars is time-consuming, open to abuse by drivers hoping to minimise their tax and expensive for companies liable for fines for late returns to the Inland Revenue or for supplying incorrect information.

Now Smart Card technology is being used to solve the problem. Miledger, a new product from PHH Vehicle Management, which specialises in the management of company cars, uses Smart Cards to monitor business and private mileage.

Miledger is an on-board micro-computer, about the size of an electronic pocket organiser, which automatically records the time, length, duration and type of each journey made. The unit can be sited, for example, on the driver's sun visor. When the driver switches on the ignition, Miledger bleeps prompting the driver to select whether the journey is for private or business purposes. If the driver fails to do so, the journey is automatically logged as a private one. Journey data is transferred from the unit to a Smart Card when the download button is pressed. Data from the Smart Card is downloaded into a PC which holds the Miledger software via a card reader. The PC produces reports ready for inclusion in tax returns. The Smart Card identifies a driver, while Miledger identify's a vehicle, so driver A could make a journey in driver B's company car and the mileage would be attributed to A and not to driver B.

Keith Greenhead, Director of Fuel at PHH Vehicle Management, said: "Miledger is a simple, foolproof method of monitoring mileage and avoiding penalties. It will mean that drivers no longer have to worry about demonstrating that they have indeed travelled claimed business miles nor will they have to adopt complicated or cumbersome processes to record their mileage.

"Employers will also be reassured that their drivers are submitting genuine business miles claims, reducing the overall cost of fuel to them and the risk of fines. Since Miledger accurately tracks private mileage too, it allows employers to recover the true cost of the fuel used for those journeys from the employee where appropriate. On average this could save employers at least £240 per year per driver."

The system was developed in partnership with Richard Menage, Managing Director of Miledger and Ken Wood, Technical Director. PHH has exclusive worldwide distribution and marketing rights for the product. Miledger can be purchased outright at a cost of £265, including two Smart Cards, installation and a 12-month "return to base" warranty. Software registration and card reader - £250 one off payment, and software maintenance and support £100 (prices excluding VAT). Miledger can also be leased or lease purchased.

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Campus Card in Florida

The Huntington National Bank has been awarded a three-year contract to provide Smart Card services on the University of Central Florida campus in a scheme including students, faculty and staff. The cards will be offered through systems integrator Cybermark, a company owned jointly by the Bank, Battelle Memorial Institute and Sally Mae.

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Left:
The PHH miledger as fitted in a vehicle [PHH]

GCA Launches NIM Project

The Global Chipcard Alliance (GCA) has launched its Netuser Identifier Module (NIM) project to design a single application that will enable Smart Card terminals worldwide to identify and grant access to "foreign" application providers.

The aim is to be able to link terminals and application providers across networks worldwide to achieve global network-enabled interoperability and worldwide chip card acceptance.

David Anastasi, President of the GCA, explained: "Essentially, the NIM will enable a consumer's Smart Card data to be identified at local terminals worldwide. When a local terminal does not initially recognise a Smart Card from a different provider, it will ask for the NIM application. After querying the NIM, the network will contact the home application provider, which will then link the Smart Card's application information back to the user. As a result, interoperability can be realised for multiple applications, including those that may not be present in the terminal itself."

The successful implementation of NIM will depend on commercial "roaming agreements" between GCA-based providers - similar to those made by cellular phone carriers and bank teller machines to address local and remote customer access.

Gerard Ketelaar, GCA's Vice President, said: "Using the international telephony network as a model, the GCA will shape interoperability agreements by creating a worldwide network for Smart Card data transport - in effect, a Smart Card dialtone that allows universal access throughout the network."

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Mondex Web Business Site

Mondex International (MXI) has created what it describes as a virtual business centre on the Internet for its customers and suppliers at www.mondexinternational.com.

The MXI virtual business centre offers customers access to up-to-the-minute market and product information in support of their business activities.

In addition, users can access a range of dedicated individual product sites from www.mondexinternational.com, including; the new Mondex Electronic Cash site www.mondex.com and the MAOSCO consortium administered by MULTOS web site www.multos.com.

The initiative forms part of Mondex International's wider communications strategy to separate corporate communications from product communications for clarity and ease of use. The company also recognises the importance of distinguishing the Mondex Electronic Cash brand from MXI - the Smart Card product and services company whose other products include solutions based on MULTOS, the multi-application Smart Card operating system.

Christopher Masters, Head of Marketing, Mondex International, said: "We are one of a new breed of growing virtual' businesses operating in a diverse global marketplace with shareholders, customers and partners on every continent. Our vision with the MXI virtual business centre is to create, over time, a complete business environment for our customers which operates virtually over the web.

"Today, we can offer information, interactive dialogue and a state of the art search engine - but this is just the beginning. We have plans to introduce dedicated chatrooms' and other services to serve our marketplace more effectively."

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Deutsche Telekom Order for ODS

ODS Landis & Gyr has received an order from Deutsche Telekom to produce 100,000 "changing image" (lenticular) telephone cards, which from different points of view show two different images. A first edition of 10,000 of these cards has been issued by Deutsche Telekom for TeleCard 98 in Munich. The card bodies for the lenticular cards are provided by MOVI-CARD while ODS manufactures the modules and completes the production process.

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Microsoft Certificate for Cardman

Cardman, a Smart Card reader developed by IT security specialists Utimaco Safeware AG, is the first worldwide to obtain Microsoft's PC/SC certificate becoming the only chip card reader on Microsoft's Hardware Compatibility List with the logo "designed for Windows 95/98/NT."

The reader has been certified at ITSEC (Information Technology Security Evaluation Criteria) E2 security level. It connects to the serial port and is also available in PCMCIA format or integrated into a keyboard.

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News in Brief

Nationwide Building Society says it has no immediate plans to roll-out iris scan ATMs following a six-month trial in Swindon UK (SCN December 1997, page 228).

The Building Society was testing the reaction of 1,200 customers to being identified by looking into a camera which recognised their unique "eye print." The post trial analysis will consider the cost of the ATMs and comments from customers, including ease of use and the time taken to withdraw money.

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Thyron Limited has announced that its handheld Financer point-of-sale terminal has been granted Full Type Approval by Mondex International. The terminal's dual Smart and magnetic card interfaces enables interoperability with Visa Cash, EMV and standard credit/debit cards, and other proprietary card schemes simultaneously in one small unit.

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Gemplus has launched a consultancy service for businesses and organisations considering implementing a Smart Card scheme and are seeking advice on the technology and which system is best suited to their needs.

Paul Carpenter, previously with Coopers & Lybrand where he was a consultant in the financial services group specialising in electronic commerce applications, will co-ordinate the UK activities of the consultancy from Gemplus' premises in Havant, Hampshire. The new consultancy service can be contacted on Tel: +44 (0)1705 488036 or Fax: +44 (0)1705 472081.

Dassault Automatismes et Telecommunications' Tesoris and Talento electronic payment terminals have passed EMV (Europay/MasterCard/Visa) compliance tests at the FIME laboratory in Caen.

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Siemens Microelectronics is the leader in the Smart Card chip market with 43 per cent market share in terms of revenues in 1997, says a new Frost & Sullivan report, Worldwide Smart Card ICs Market. The report gives total market share breakdown for IC manufacturers as: Siemens 43%, ST Microelectronics 33%, Motorola 14%, Philips 6%, Hitachi 2%, Others 2%

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Gemplus manufactured and delivered 5,000 new MasterCards to a leading bank in six working days using its new digital card printing service - the first of its kind in the UK.

The manufacturing facility at Havant, Hampshire, was recently certified by MasterCard/Europay and Gemplus says digital printing provides fast turn-around times, shorter print run facilities and low cost, high quality machine proofs.

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1998 Europay Members' Meeting
by Jane Adams

The 1998 Europay members' meeting in Cannes saw the payments association make two major strategic announcements about smart payments cards. Europay has joined the MAOSCO consortium, adopting the MULTOS multi-application card operating system. It will also work with Visa and its purse partners to develop the Common Electronic Purse Specification, the stored value system developed by Visa in association with ZKA in Germany and SERMEPA in Spain.

The first Europay bank to implement MULTOS will be UK's Midland Bank with a live trial of the MasterCard MCPA credit application on MULTOS cards in 1999. Europay expects further announcements from other member banks in the near future and is making immediate preparations to support members who wish to implement MULTOS.

One of the key factors in choosing MULTOS, said Europay chief executive Louis Noel Joly, was its availability today. Another was its ability to load applications post issuance. "For us MULTOS is the best combination of security, protection of one application from another, performance and power," he said.

Joly insisted that Europay saw operating systems as far stronger than standardised applications programming interfaces. Nonetheless Europay is keeping a watching brief on JavaCard API developments, but has no specific plans in that area, confirmed Marc Dutrieux, senior manager, chip programme management and smart card development.

The endorsement of MULTOS is not exclusive; Joly stressed the importance of members retaining the competitive freedom to choose the system they want.

Driven by the coming of the euro, Europay will now offer its members two strategies for implementing interoperable purse - short term purse federations and long term standardisation. This approach will see the continuation of Clip, Europay's existing purse product, as a brand name rather than as a technical platform.

Purse federations are groupings of regionally defined operators using interoperable technology. The first one will be based around the GeldKarte, already in use in Germany with 45 million cards issued so far.

The agreement between Europay and Zentraler Kreditauschuss ZKA, the association representing the German banking industry will allow German banks to add Clip as the interoperable acceptance mark for cross border transactions. This will apply to all Europay branded GeldKarte cards from October 1999.

By encouraging interoperability between existing programmes, federations will leverage investments in current technologies and products. Another potential federation could be formed around the European Proton operators - talks are underway with Belgian and Dutch operators. SIBS, operators of the Portuguese PMB purse are also discussing interoperability with Spanish operators CECA 6000 and 4B, with Europay assistance. Europay input will vary but may include international branding, network clearing and settlement, rules, implementation support and public relations.

The locations of cross border Clip acceptance points will be decided from research on cross border ATM usage. Discussions are already underway with Austria, Switzerland and Spain about acceptance of the Clip Geldkarte. However products from different federations will still not be able to interoperate, providing branding challenges at popular tourist locations.

Potential issuers with longer term plans will be encouraged to wait for the CEPS standard to be finalised. Europay will then define a fully interoperable purse product under the Clip brand based on this standard using Clip as the cross border acceptance mark.

Europay is not going so far as to endorse CEPS wholeheartedly though just yet. The aim, said Dutrieux is to ensure that the European Committee for Banking Standards endorses CEPS as a neutral industry standard. "It is important that it is not seen as a de facto standard imposed by one body," he said. CEPS itself is an implementation of the standards proposed by the ECBS itself earlier this year.

Once CEPS has been approved by ECBS, Europay will base its new purse product on it. Europay's aim is to offer European banks, free of licensing costs, an international acceptance brand and minimum technical requirements to enable cross border purse usage.

The dual approach will allow Europay member banks to implement a cross border purse, while still being able to enhance and promote their existing domestic schemes. MULTOS may play a part here, said Dag Fjortoft, deputy general manager, products and services, allowing domestic and global purses to co-reside on one card.

The standard will be ready by Q1 1999, with the first pilot likely by 2001. It's crucial to do pilots early enough to allow for rollout during the cash introduction of the euro in 2002, Dutrieux said.

The choice of CEPS has apparently not alienated MasterCard. Although MasterCard is committed to Mondex, it recognises that European member banks have different needs from banks elsewhere, said Dutrieux. "It doesn't cause any problems in the partnership," he said. In fact Europay offers Mondex too. "Members have the choice," he said. "Europay is perfectly OK with members choosing Mondex."

Europay is also using smart cards for internet commerce, an activity driven, says Fjortoft, by the need to provide different security solutions based on the amount of risk each market is willing to bear. "I don't believe SET will be the only solution in this arena," he said. Two projects are underway – Cybercard, based on C-SET, the chip internet payment method developed by Europay France with Groupement des Cartes Bancaires, and SCPP, a project developed by Europay and Barclay's Bank.

A Cybercard trial has been running since October 1997 in France, involving approximately 100 merchants and available to all French bank card holders. Now Europay is planning a convergence pilot with the French Visa banks. This will use full SET and chip cards rather than C-SET. A demonstration system is scheduled for Q4 98, then the conversion of the existing pilot and a full national rollout, with dates yet to be set. Conversion won't require card changes, simply a software download to the home based pinpad terminals used in the trial.

"The significance of this is that it will be a major rollout of SET in an European country," said Europay's acceptance development manager, Brian Morris. Some of the over 20 Europay banks already involved in magstripe SET pilots also intend to trial chip with SET but no specific plans have been announced yet.

Elsewhere, an inhouse trial of EMV smart cards for payments on the internet is due to start with Barclay's bank in October 1998. Morris is keen to emphasise that Europay views this as primarily a research project, with the results to be used to further SET plans. It will not be a rival to SET, he said.

Europay's main smart card focus is still chip credit/debit interoperability. The next Europay country to follow UK and France and convert to EMV debit and credit will be Italy. Europay is now analysing with the Italian banks the possibility of adding purse functionality, said Javier Perez, general manager, regions and business, Europay. While specific dates have not yet been set, Italy intends to follow the United Kingdom's UKIS approach to the migration.

Discussions with Turkish banks are underway about migration to EMV too. Five EMV trials are planned for central Europe this year with 15 in total to run throughout Europe by the end of 1999.

Europay executives emphasise MULTOS as the backbone for their chip strategy, carrying purse, EMV and internet applications. One potential Europay backed implementation, announced at the meeting by De La Rue, may see the existing French credit and debit application, B zero prime, and EMV co-existing on MULTOS as an upgrade path for the French banking industry to EMV.

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Smart Cards Yes! - But Has Their Introduction Been So Smart? Part 3

A Special Article by Prof. Worthington

Transcard - Sydney

Another successful introduction of a contactless stored value Smart Card is to be found in Australia and although the ongoing scheme is relatively small, it does demonstrate that with the right customer proposition, an entrepreneurial company can achieve positive results, without the backing of government agencies or international card associations.

Transcard is a contactless Smart Card scheme developed by a multi application software company now called Chip Application Technologies [CAT]. The company was successfully floated on the Australian Stock Exchange in mid 1997 and has subsequently licensed its multi-application system technology in a number of overseas markets. CAT has also partnered with Visa International, to develop a contact multi-application Smart Card in Australia, which will include both stored value capability and loyalty functions on a single chip. This confirms one of the lessons that Visa has learnt from the Visa Cash trials in Australia, that Smart Card payment systems must provide the consumer with incentives and additional utility, to promote the take up, continued usage and merchant acceptance of Smart Cards. Thus it is hoped that the Visa Cash/CAT card will deliver to the consumer, what the consumer wants and this includes a combination of electronic purse, incentive rewards, ticketing, memberships and access control programmes. These applications have proved to be attractive to consumers during Transcard's pilot scheme and subsequent roll out in several suburbs of Sydney.

The initial pilot took place in the St. Mary's suburb from March 1995 to February 1996 and was anchored by Westbus, a privately owned public transport operator. The pilot incorporated buses, a number of local retailers [including the local swimming pool], McDonalds, a Shell Service Station, take away food outlets and a local newsagent. Around 1,500 cards were distributed to bus passengers and residents of the area, with Westbus having a promotion where customers paid $10 for a Transcard, with $15 already stored on the card. The Westbus incentive scheme also provided passengers with *every eleventh trip free* when using their Transcard to pay their fare. As the card was able to hold multiple incentive schemes on the chip, other merchant participants could run other loyalty programmes, for example a fast-food outlet offered a free drink once a number of burgers had been bought using the card. The cardholder can acquire and/or reload a Transcard by going to a local CAT agent and the card can be reloaded on presentation of cash or a debit card, up to a value of $500. The cardholder then uses this stored value to purchase goods and services and the cost of each transaction is automatically deducted and a new card balance is recorded. As the card is contactless, there is no need to swipe or insert the card, the cardholder needs only to hold their purse or wallet containing the card up to the card reader and press a pad on the reader to complete the transaction.

Following the success of the pilot an improved second generation Transcard was introduced in St. Mary's and a new area of The Hills, in April 1996. At this time Westbus introduced a new bus service, The Hills-City Express, a rapid service to and from the Centre Business District [CBD] of Sydney. From the outset it was felt that Transcard should be used on this service and agents were consequently signed up to issue and reload the card. Many of the passengers on this service used return tickets and the use of Transcard enabled Westbus to introduce return tickets with an in-built 5% discount. However, following consumer research in March 1997, the Westbus incentive scheme in The Hills was changed from *every 11th trip free*, to a 10% discount off the cash fare for all trips, and thus when used in conjunction with purchasing a return ticket, the passenger is effectively getting a 14.5% discount off the two way single cash fares, when they use Transcard. Not surprising by mid 1997, up to 50% of all fares in the Hills District were on Transcard and a Swatch watch containing the CAT chip had been introduced, that worked exactly like a Transcard.

The Transcard scheme is ongoing and cardholder numbers are still increasing, with usage on some of the most frequented bus routes, as high as 80%. There are now approximately 10,000 Transcards in issue, usable on over 100 buses and at more than 60 other goods and services providers. All this has been achieved with very little marketing and through a company for whom operating such a scheme is a non-core business. If anything Transcard has been too successful for CAT, but they cannot wind the scheme down, because Westbus, the other participating retailers and the cardholders like it so much.

This demonstrates the power of a multi-application Smart Card, which can appeal to all parties, by providing a cash replacement incorporating loyalty and incentive programmes, based on card usage and spending patterns.

There are however, lessons that can be learnt from the introduction of Transcard. Firstly, that if there is a time lag between the end of the pilot and the commencement of the roll-out, then acceptors and cardholders will question the commitment of the scheme operator. With Transcard for example, the cardholders in the St. Mary's area were wary of the second generation Transcard introduced in April 1996, because their old cards, which still contained value, would not work in the new terminals and they questioned the value of buying into the new cards, in case the scheme was only another pilot and they were again left with stored value, that was in reality, inaccessible value. Secondly, that different incentive schemes are required for different segments of the population. In the Transcard case, the two areas of St. Mary's and The Hills have quite distinct population characteristics and the incentive that worked for Westbus in St. Mary's, *every 11th trip free*, did not work in The Hills, where a percentage discount was better appreciated. Thirdly, and perhaps most significantly, Transcard has managed to introduce a successful stored value Smart Card which appeals to cardholders, service providers and their personnel, without the need for the involvement of any of the traditional suppliers of financial services and without being subject to financial regulation. The implications of this and of the user friendly focus of the product, will need to be considered by all those involved in the introduction of Smart Cards.

Telstra - Australia

The Telstra Corporation is the dominant telecoms provider in Australia, with some 38,000 public payphones, which have been using magnetic stripe cards since 1989. Since then Telstra's revenues have more than doubled, whilst its overheads have halved, testimony to the income generation and cost savings to be gained when pre-paid cards replace coins in this particular application. Telstra entered the stored value Smart Card market, when it wished to replace its old network and the calls for tender, only produced replies from Smart Card suppliers. Telstra was already familiar with the stored value Smart Card, having participated in both the Visa Cash pilot on the Gold Coast and in the Quicklink pilot, using Proton technology, which concluded in the city of Newcastle in January 1997. Despite experiencing a very low volume of transactions in both pilots, Telstra could see the potential for Smart Cards, both as a payment mechanism for the payphones and as a multi-application card. Their business case was built upon utilising their existing infrastructure and finding new applications, particularly in unattended POS situations, plus attracting new segments of cardholders, especially those people under the age of eighteen.

Telstra sells around 14 million phonecards per year, in denominations of $5,$10, $20 and $50 and in August 1997 it began to release these as disposable Smart Card based on the Chipper platform which itself is an alliance of a telco, PTT Telecom Netherlands and a bank, Postbank. Telstra had already converted all of its payphones to accept the new stored value Smart Cards and by mid 1998 it was planning to begin issuing reloadable cards, with multi-functionality. The Chipper reloadable Smart Card has ten service boxes on the card, each of which can be programmed to support a different function. These could include electronic purse functions for vending machines, parking applications, fast food outlets or to allow micro payments to be paid for information and entertainment purchased off the screen in a domestic setting. The card would be reloadable in one of the 10,000 Telstra terminals, that would be positioned in outlets that already sell Telstra cards and these would take the reload value directly out of the cardholder's bank account. A limit of $300 is planned to be imposed as the maximum value that can be loaded onto the card and each card would have a serial number that could be used to refund unused value if the card is lost or stolen. The cards can also operate discount schemes for service providers, loyalty programmes to incentivise usage and hold a list of frequently dialled telephone numbers.

Telstra's strategy to achieve critical mass and identify killer applications, includes allowing organisations to issue Telstra cards, but under their own brand names. These organisations need substantial customer bases and suitable segments of the population, but the only link with Telstra would be the acceptance marque, a red arrow, which would appear on the card. An example of this approach is the card issued by the Southern Sydney Institute, a tertiary and further education college who have replaced a variety of different student cards, with a stored value Smart Card, using the Telstra technology.

The new card contains the student's photograph, their name, student number, their membership of the student association, a bar code for the library network, a magnetic stripe for access control and a chip with an electronic purse function, plus nine other service boxes. The purse facility can be reloaded at locations around the college campus and used for photocopying, vending and cafeteria purchases, as well as for telephone calls from payphones. Telstra has aspirations to widen the acceptance beyond the campus, to parking meters, service stations, convenience stores and sports and entertainment venues. Similar cards could be issued by city centres, shopping malls, sports clubs, automobile associations or transport providers and in this way these organisations could hold the relationship with their members/supporters, whilst Telstra would generate revenues from charging an annual fee per card to the card issuers, from merchant service charges and from the float generated by loading value onto the card.

Of particular interest however, is the target market of the college campus cards. These would be issued to students largely under the age of eighteen, the very segment of the market that is prohibited by the banking regulations from holding a bank account. This makes them ineligible for the type of stored value Smart Cards currently being issued by the financial institutions and yet paradoxically they conduct many low value, high frequency transactions and are well used to unattended purchase situations. If Telstra can reach a critical mass with this segment of the population, then they could build on an *occupancy strategy*, whereby their cards are already in the hands of many young, frequent users of Smart Cards and by adding applications these cards could become the *front of mind* stored value Smart Card, that is carried and used on a daily basis, by a large proportion of the population.

Conclusions

Whilst the Smart Card may be a superior technology to the magnetic stripe, the successful introduction of new technologies requires more than just proven superiority, [witness the eventual success of VHS over Betamax in video tapes], even though the latter was thought to be the better technology. The Smart Card trials or roll-outs described above offer a wide range of learning points for all those involved in the introduction of the Smart Card. These include issues such as recruitment of cardholders, selection of applications, degree of governmental encouragement, the importance of usage incentives and attitudes towards branding and "ownership" of relationships. As critical success factors these are just as important as operating systems, chip capacities or issues such as audit trials and yet they have so far not had the attention paid to them that they deserve.

Features of Selected Smart Card Trials and Roll-outs

	Disposable	Reloadable	Contact	Contactless	Ongoing
Visa Cash Gold Card	•	•	•		
Visa Cash Leeds		•	•		•
Mondex Hong Kong		•	•		•
Octopus Hong Kong		•		•	•
Cash Card Singapore		•	•	•	•
Transcard Sydney		•		•	•
Telstra Australia	•	•	•		•

What the research also indicates is that eventually cardholders may hold several different stored value Smart Cards, each with different applications, brands and relationships. For example one card could be a transport card, for use in mass transit, road tolling and parking, with additional applications such as vending, micro-payments off the screen and access control. Enhanced with usage incentives based on its daily use, it would be reloadable either with cash or cards at an ATM or via an in-house terminal linked to the screen or the telephone. Another card could be for international travellers, with payment capabilities for pay later transactions such as travel tickets, frequent traveller loyalty programmes, passport and drivers licence information held on the chip and a multi-currency electronic purse, to facilitate immediate access to funds in regular destinations. Yet another card could be issued by a telecoms provider that facilitated usage in both public payphones and mobile phones and enabled micro-payments to be made for purchases made in the so-called *networked home*. Here, with the domestication of information, cardholders would be able to pay for infotainment and edutainment services that they draw down from their screens and reload their card with value over the telecoms network.

Whatever the eventual composition of the stored value Smart Cards, their successful introduction will need to be based on a consideration of factors other than just their technology. In the new market environment, where supply often exceeds demand and where the primacy of the individual consumer is celebrated rather than suppressed, a better understanding of consumer and merchant requirements will be required if the Smart Card, is to live up to its name and be smartly introduced as a new enabler for the distribution of services.

Professor Steve Worthington
Staffordshire University Business School

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Alcohol Vending Machine

Alcohol vending machines using contactless Smart Cards are being launched for the first time in the UK. The machines are aimed at hotels, airports, nightclubs and leisure industry venues.

Customers can purchase or reload a VSP Smart Card and use it with a PIN to obtain alcoholic drinks. The machine is capable of dispensing beers, mixed spirits and wine in cans or bottles. It can be programmed for use only during designated licensing hours, help to prevent under-age drinking by limiting access to authorised adult cardholders and keep a record of sales. The scheme is being launched by VSP Technology and vending company Evend, who are looking for the same success as VSP company Banque-Tec International which has over 200 machines operational in Sydney and Melbourne and around 400 installations already planned before mid-1999.

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GSM SIM Order for ORGA

ORGA Card Systems Inc., the US subsidiary of ORGA Kartensysteme of Germany, has been selected as the exclusive provider of GSM SIM Smart Cards by Iowa Wireless Services for its PCS network scheduled for launch in the Autumn. ORGA will supply its 16K bytes dual-mode SIM cards and its OTA (over-the air) Express Gateway System which enables operators to update and add functionality to SIM cards without physical access to the subscriber's card.

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French Secure e-Commerce Plan

France Telecom, Gemplus, Matra Hautes Technologies and VeriSign have set up Certplus, as the first French national certificate authority providing secure intranet, extranet and e-commerce applications to the French market by utilising Public Key Infrastructure, telecommunications, Smart Card and system integration services.

Certplus will provide secure e-commerce applications to French enterprises, government agencies, web sites/merchants and consumers. These digital certificate-based applications will provide customers with greater confidence to engage in electronic transactions and communications over the Internet for healthcare, government services, home banking, telecommunications, secure e-mail and transportation.

It will use standard Internet protocols including Secure Sockets Layer (SSL) and Secure Electronic Transactions (SET).

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Bull Commonwealth Games Card

Bull is providing electronic purse cards, EFTPOS Solfeo terminals and Proton card balance checkers for the Commonwealth Games at Kuala Lumpur. Bank Burniputra, the official bank for the Games, is launching the Juwara Sukom card which is the first implementation of electronic payment in the country.

Bull is supplying CC20 prepaid, disposable Smart Cards which will be sold at authorised merchants, while Bull's CC80 cards, which are EMV compatible and reloadable, have been distributed to VIPs.

The CC card range is also compatible with Proton, the Banksys technology adopted by Malaysia for national Smart Card roll-out in July 1999. At that time, Bank Burniputra will introduces reloadable Smart Cards.

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