Session 4: Customer Satisfaction Through ICT

Presenter

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Topic: Issues and Challenges in Providing Quality ICT Infrastructure Service Delivery in a University Campus Environment
Issues and Challenges in Providing Quality ICT Infrastructure Service Delivery in a University Campus Environment

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Abstract

Within a university environment, Information and Communication Technology (ICT) has become an important enabler in disseminating and sharing of knowledge through teaching, learning, research and supporting services to the core business. Thus, in this era, it is important that the body responsible for delivering the ICT services within a university campus reorientate the mode of delivery to that of a service provider. Based on this, the Centre for ICT (CICT) at the Universiti of Teknologi Malaysia sets the goal to achieve level three within the IT Management Process Maturity Model (Gartner Research, 2004). In this level, the IT organisation is supposed to define the service classes, the price associated with each classes and how to guarantee the service level as agreed upon. Traditional ICT service delivery is very much reactive and chaotic in nature. To migrate to this level, three tightly coupled components and issues, which relate to these components need to be addressed properly. The three components are technology, processes and people. How the three components relate to the ICT infrastructure strategic map and what are the issues and challenges will be deliberated and discussed in this paper.
Introduction

The rapid development in Information and Communication Technology (ICT) has impacted the way we interact and manage our lives. ICT has become a utility, which needs to be managed to assist core business of an organisation in achieving the mission and vision of that particular organisation. Business driven IT Management is defined as "the application of a set of models, practices, techniques and tools to map and to quantitatively evaluate dependencies between IT solutions and business performance and using the quantified evaluation to improve the IT solutions' quality of service and related business results." [J. Sauvé et al, 2006]. Thus, in order to deliver quality of ICT services to a particular organisation, the proper model, processes and related technology need to be studied to map to the actual business of the organisation.

Many misgivings occur when technology providers tries to propose their solutions to institutions of higher learning, which very much differ from commercial institutions, where even institutions of higher learning are unique to each other. Based on the comparison between campus and company environment, the organisation, process and technology model of campus IT service management have been proposed and implemented for some Chinese Universities in China [W. Zhen, Z. Xin-yu, 2007]. Though the basic mission of all universities is to perpetuate growth through knowledge sharing and creation, augment discovery and enhance creativity, the emphasis, culture and background are all different which makes service delivery to individual university to be unique. The impact of cultural conflict on service delivery has been studied and has to be factored in when developing the proper framework. [S. Jia, X. Geng, 2006]

This paper looks into the issues and challenges faced by the campus ICT infrastructure service provider in delivering quality
service delivery to the customers and end users. This is covered in section III. Section IV describes the strategic plans and initiatives to deliver the required quality services. Results and discussion is elaborated in section V followed by concluding remarks in section VI. The following section describes the current business service model involving direct customers and end users.

UTM ICT Service Hierarchy and Delivery Model and Relationship

The IT services which directly deals with teaching and learning, research and consultancy form part of the academic computing services provided by the university. The group, which constitutes the academic computing community, are the students, lecturers and researchers whilst the business units responsible are the faculties, the research institutes and Centres of Excellence (COE), Centre for Teaching and Learning (CTL), and the library (Perpustakaan Sultanah Zanariah). The administrative computing services consist of IT services deployed for administrative units of the university to administer and manage the running of the core business. Typical applications include the Human Resource and Financial applications and Student Management System. Other system includes Research Management System and Asset Management System. It is incumbent that the system deployed (e-learning, on-line knowledge services, informational repositories) captures the actual business processes and translate it to help the university achieves its goal and mission. The underlying layer is the university ICT infrastructure to help drive both the academic and administrative computing services. Within the wider context, Business Driven IT Management should be able to assist the university top management gauge the impact of IT on the business. Business strategies, which constitute individual ICT business plans, should be carefully aligned with the individual ICT plans within the functional and operational strategies to produce overall quality ICT services. However, the scope of this paper is
only limited to quality service delivery of the ICT infrastructure, the foundation for other IT related services. It is also important to note that ICT infrastructure services in itself is dependent on other parties such as the external Internet Service Provider (ISP) which links university to the outside world and utilities such as electricity and air condition managed by the facility department of the university.

![Figure 1 UTM ICT Service Hierarchy](image)

To understand from an architectural point of view the factors affecting the service delivery, the components in the service delivery needs to be identified. There are three main components involved; the end users devices, the communication channel, which can either be wired or wireless and the third is the services being sought which typically, resides in a server. Figure 2 depicts the three integrated components.
Issues and Challenges

Having identified the ICT service hierarchy and service delivery architecture, let us identify the issues related to quality service delivery and its challenges. One of the prime quality measures in ICT infrastructure service delivery is service availability. To the end users, the important thing is to be able to access the end destination, which provides the services (e-learning materials, online databases etc). Here the service provider is to provide the means of accessibility in whatever way possible taking into consideration the latest technology in end devices.

Availability can be defined in two ways, first the extent of coverage and second, the uptime of the services offered. The service accessibility has to be provided at anytime (or all the time), anywhere and by whatever means possible (anyhow). The extent of coverage is a policy of the university. Since the university has targeted that all the population of the university, including off campus students and staff can access on line information provided by the university, the ICT plans should incorporate this.
requirement. The first challenge in providing this coverage is the considerable finance needed to deploy the services. This is followed by determining the right technology and approach to implement. If the planning and design is not done properly, then ultimately the service provider will meet with the situation where services are unavailable (down) for the provided (covered) services most of the time. The customer will then say that it is better not to provide the service.

Availability can be more properly defined as follows;

\[
\text{Availability} = \frac{T_{op} - T_{down}}{T_{op}},
\]

where \( T_{op} \) is the agreed service operation time and \( T_{down} \) is the (cumulative) service downtime. [Schaaf, 2007]. Based on this, from the users' perspective, availability has to be a sum measure of operational time of the user's end device, the communication channel and the destination services.

Thus cumulative availability,

\[
\text{Availability}_{cum} = \text{Availability}_{end \text{ user}} \times \text{Availability}_{channel} \times \text{Availability}_{end \text{ services}}
\]

A good understanding of the various factors, which influence operational availability of each component, has to be done especially at the design stage. Factors directly beyond the control of the Internal Service Provider (in this case CICT) have to be managed to ensure minimal disruption to the service.

Within the last years, the main causes of unavailability of services are denial of services caused by Internet worms and bad traffic generated from the user's computer, power failures causing the network equipment to fail and occasional hardware failures at the servers.
The rapid change in technology has caused a gap between end users' competency in handling their devices and the technology they adopt. A classic case is early adopters of Windows Vista who had certain protocols turned on which caused a considerable traffic to be generated. This degenerated the services to other users. For the service provider, the rapidly changing technology has also impacted the management of the ICT services wherein the limited resources of ICT personnel has to be constantly retrained to ensure their competencies is in pace with technology.

In general the nature of ICT service management has always been reactive and firefighting. This nature has been characterised by existence of multiple help desks, which makes resolution to incidences time consuming, untraceable and impedes improvement. This phenomenon is further compounded by ICT units acting in silos especially in resolving incidences and problems.

**Strategic Plans and Initiatives towards Quality ICT Infrastructure Service Delivery**

An ICT infrastructure strategic map based on Balanced Score Card was formulated to achieve the quality service delivery. As shown in figure 3 below, from the users' perspective, the primary measure of quality is service availability and services, which are provided with integrity and confidentiality. It is also the goal to ensure end users are well informed of any service unavailability and well trained to use the services provided. Well designed infrastructure services must be done to ensure reasonable service level, which in turn can be measured and be published to end users.

To complement these initiatives, proper process must be in place to overcome the ad-hoc and mostly reactive nature of ICT management. Since security is one of the important threats facing ICT services delivery, a standard ICT security code of practice must be adopted. In this case ISO27002 (formerly called
ISO 17799), a code of practice for information security, officially titled 'Information Technology - Security Techniques - Code of Practice for Information Security Management' is adopted. In addition a standard framework for IT Service Management, ITIL (IT Infrastructure Library) together with IT Service Management (ITSM) is adopted to ensure quality service delivery and service support. The latest information on ITIL is available from [http://www.itil-officialsite.com](http://www.itil-officialsite.com).

Human resource is the most important asset in a service delivery organisation. Sufficient and competent staffs are needed to ensure timely delivery of services. Unfortunately, an audit of the staff strength needs to be carried out to ensure the staff strength is optimum. The Skills Framework for the Information Age (SFIA - [http://www.sfia.org.uk](http://www.sfia.org.uk)) has been identified as a potential reference model for the identification of the necessary skills in ICT service delivery, support and management. More study needs to be done to customise this model to the Malaysian environment in the managing ICT for university.

![Figure 3 UTM ICT Infrastructures Strategic Map](attachment:image.png)
Based on the strategic map, strategic initiatives were carried out. This included redesigning the network to ensure better availability through single hop network architecture with physical separation of the academic, administrative computing infrastructure and as well a separate one for the residential colleges' network. This is done to reduce the impact of power failures at the faculties and at the distribution. Mission critical application platform are redesigned with redundancies or in multiple active modes for high availability. To minimise risk due to dependency on ISP or external link, multiple ISP is deployed with defined service level agreements. These are proactive measures to enhance service delivery.

To minimise impacts and to react to incidences, a monitoring centre was established. The monitoring centre, named CCMC (an abbreviation for Command, Control and Monitoring Centre) was setup to monitor all services though a common area, to consolidate all silo-based activities and to react to incidences in a more coordinated manner. The establishment of CCMC is also to broadcast to users all incidences, the level of services attained for a particular service within a stipulated time frame, to improve service delivery through regular discussions on problems and to coordinate all changes. At the moment, an SMS system has been established where the operators are alerted through SMS when faults occur. However, this system needs further improvement by adding more services to monitor.

Results and Discussion

The initiatives are ongoing based on the plans initially formulated four years ago. The diagram below shows some snapshots of services monitored. Figure 4a shows the monitoring centre, which started operation in 2006. Figure 4b shows statistics of some services being monitored. There are many kind of services monitored which includes the application services, the network
services and infrastructure availability. Figure 4c shows a monitored service level availability for e-learning in the year 2007. The statistic showed that the e-learning service availability was 98.7%. However this is not an end-to-end service availability (cumulative availability as defined before). We hope in future we can measure end-to-end service availability and other performance measures such as mean time to repair (MTTR) and mean time between failures (MTBF) as defined in [T. Schaaf, 2007]. We also have not carried out any comparison to study the impact of changes made before and after the initiatives as been done by other researches [S.H.C Chan, YH Chan, 2007]

Figure 4a Command Control Monitoring Centre (CCMC)
Figure 4b Sample statistics of services provided

Figure 4c Monitored Service Level Availability for e learning (2007)

The initiatives will be continued and we hope to target to level three within the IT Management Process Maturity Model (Gartner Research, 2004) wherein proper service level agreement can be defined with the appropriate associated costs between the internal service provider and the end users and customers. Thus the belief that IT service is a strategic utility can be realised.
Conclusion

The paper has only deliberated on quality service delivery within the framework and scope of ICT infrastructure services. However, quality ICT service delivery is more encompassing which covers the full hierarchy of ICT services which ties in closely with the business processes and activities. Further work needs to be done in this direction.
References


Biodata

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Session 4 : Customer Satisfaction Through ICT

Presenter

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Topic : Customer Satisfaction via Information and Communications Technology
Customer Satisfaction Via

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Abstract

This paper attempts to elucidate the importance of Information & Communications Technology (ICT) in Customer Satisfaction. It explores several effects which the ICT has in grooming a new landscape for doing business by organisations. Several ICT innovations are discussed in relation to providing good customer services by both types of organisations: brick and mortar as well as online businesses. In addition several causes, issues and solutions faced by organisations in attaining customer satisfaction are identified. A glimpse on a recent development in providing good services to UTM students will also be introduced. However the author concludes that the importance of the human factor in customer satisfaction is still core and can never be replaced by any technologies be it ICT.
1.0 INTRODUCTION

1.1 Definition:

Customer satisfaction depends on a product's perceived performance in delivering value relative to a buyer's expectations. If the product's performance falls short of the customer's expectations, the buyer is dissatisfied. If performance matches expectations, the buyer is satisfied. If performance exceeds expectations, the buyer is delighted.

Outstanding marketing companies go out of their way to keep their customers satisfied. Satisfied customers make repeat purchases, and they tell others about their good experiences with the product. The key is to match customer expectations with company performance. Smart companies aim to delight customers by promising only what they can deliver, then delivering more than they promise. (Kotler, 2006)

Customer satisfaction is often equated to service quality. Some of the definitions of service quality are as follows:

- Service quality is determined by the differences between customer's expectations of services provider's performance and their evaluation of the services they received. Parasuraman et al., (1985, 1988):

- Service quality can be defined as "the difference between customer's expectations for service performance prior to the service encounter and their perceptions of the service received". Asubonteng et al. (1996)
• Service quality as the subjective comparison that customers make between the quality of the service that they want to receive and what they actually get. Gefan (2002)

1.2 The Importance Of Customer Satisfaction Now is More Than Before:

Up until now it is all about organisations, but now it is all about individuals. This change in focus is mainly due to the advent and prevalent use of the internet, www and mobile communications technology. The Internet and the World Wide Web have changed the human interaction landscape to a new normal.

Thomas Friedman in his best-selling book, The World is Flat, also concurred about the present world being different from the age before Internet. He noted that the world had undergone three eras of Globalisation, i.e. superiority and power has changed hands, initially among countries in Globalisation 1.0 to among companies in Globalisation 2.0 and in Globalisation 3.0 the playing field is open to you and I, individuals of the networked world.

For instance, a boy in Rompin, may sell his unique butterfly collections to practically anyone in the world who bids the highest via e-Bay or even via his own website. Bloggers without journalism degree can produce their own stories and command a wide range of readers (and sometimes incomes). On-site reporting using a 3G phone camera can replace expensive cameras of TV broadcasting
companies. The world has indeed become flat without borders.

The empowerment of the individuals has made them at par as the big corporations. So the competition now is not only among corporations but also against individuals. And on top of that, customers too have transformed to become empowered individuals who demand global standards upon providers of local products or services. Thus it is vital and a matter of survival for companies and governments to ensure high customer satisfaction as their value proposition.

1.3 Scope of this paper:

This paper shall look into the reasons of ICT use in customer satisfaction and examining some selected case studies around the world and various industries.

2.0 TEN FORCES THAT FLATTENED THE WORLD – A Quick Review

2.1 The Fall of Berlin Wall (Communism on 11/9/1989) and the Rise of Windows (PC Revolution beginning 1977)

Socialist countries adopting capitalism and advocating democracy. This dramatic change has brought about a new opening to the once sleeping giants. The EU has overnight 25 countries from the initial 15 country-members.

Steve Wozniah and Steve Jobs created Apple II which uses windows technology as opposed to the non-user friendly of
the DOS opened up a whole new beginning in empowering individuals to use the PC more effectively. This was further enhanced by the Internet.

2.2 **The New Age of Connectivity: When the Web Went Around and Netscape Went Public**

On August 6, 1991 Tim Berners-Lee designed the WWW and HTML. It is a system for creating, organising, and linking documents so they could be easily browsed over the Internet. Later on August 9, 1995, Netscape Communications went public. It’s Netscape browser not only brought the Internet alive but also made Internet accessible to everyone. This event was further catalysed by the roll-out of Windows 95 fifteen days later.

Windows 95 would soon become the operating system used by most people worldwide, and unlike previous versions of Windows, it was equipped with built-in Internet support, so that not just browsers but all PC applications could “know about the Internet” and interact with it.

2.3 **Workflow Software**

Workflow software refers to the ability of having work processes being shared, distributed and used among others in different places without care about time zone and geographical. Examples: Wild Brain, e-Bay and Salesforce.com. Important internet standards were developed to facilitate communications among machines automatically – HTTP, HTML, TCP/IP, XML, AJAX.
2.4 Uploading

Uploading is another capability to share with others over the Internet. There are four types of uploading: community developed software (Apache, open source), wikipedia, blogging and podcasting. Uploading is thus one of the most revolutionary forms of collaboration in the flat world. Also it is a huge flattener because it responds to a very deep human longing for individuals to participate and make their voices heard.

2.5 Outsourcing

The US-India relationship resulting after the dot.com crash and Y2K events, lead towards giving Indian IT companies providing total solution for the lowest price for US companies to outsource as many functions as they can especially running the backroom operations.

2.6 Offshoring

When China officially joined the WTO in December 11, 2001, this gave a huge boost to another form of collaboration. Offshoring is when a company takes one of its factories that it is operating in one country and moves the whole factory offshore to China. China, with huge low wage workers maintains its role as a major flattening force by being a collaborator with the worldwide manufacturers on everything.
2.7 Supply Chaining

Supply chain, logistics network, or supply network is a coordinated system of organisations, people, activities, information and resources involved in moving a product or service in physical or virtual manner from supplier to customer.

Supply chaining is both enabled by the flattening of the world and a hugely important flattener itself, because the more the supply chains grow and proliferate, the more they force the adoption of common standards between companies.

2.8 Insourcing

United Parcel Service, Inc. (UPS), a package delivery company, provides specialised transportation and logistics services in the United States and internationally. It offers a range of supply chain solutions, such as freight forwarding, customs brokerage, fulfillment, returns, financial transactions, and repairs.

It has created a whole new form of collaboration and creating value horizontally. The small could act big, meaning that small companies could suddenly see around the world.

2.9 In-forming

In-forming is the equivalent of an individual's personal analog to uploading, outsourcing, in-sourcing, supply chaining and off-shoring. This is made possible with the
advent of search engines. The most famous and powerful search engines is Google (misspelling of the googol). The easier and more accurate searching becomes, the more global Google’s user base becomes, and the more powerful a flattener it becomes.

2.10 Steroids – Turbocharging all the above flatteners

Four aspects that have been identified as turbocharging the above flatteners are categorically classified as digital, virtual, mobile and personal.

Digital: Faster computing power due to cheaper, faster and efficient processor chips and storage technologies.

Virtual: Breakthrough in instant messaging (Yahoo! Messenger) and file sharing (BitTorrent etc) allows users to share songs, etc.

Mobile: Breakthroughs in making phone calls over the Internet (VOIP) eg. Skype, has reduced international phone calls to local charges.

Personal: (i) Videoconferencing makes it possible for people around the world to ‘sit’ together. (ii) Computer graphics makes it highly visual, interactive interfaces to all sorts of applications in health care, education, science and business possible and near realism. (iii) 3G and other wireless technologies and devices allows us to manipulate, share, and shape our digital content anywhere, with anyone, and totally mobile.
3.0 CASES OF ICT BOOSTING CUSTOMER SATISFACTION

There are too many cases to quote here but the following have been selected to show a sense of diversity in the use of ICT in providing services to customers.

3.1 The Retail Service industry in the US of America

It is usual for the retail service industry to be among the first to be hit whenever there is an economic downturn. Currently this is being experienced globally including the USA. However, in a recent survey conducted by the US Retail Service Research (RSR), sales reports from many of the nation’s retailers, released in early May, 2008 were surprisingly better than expected, despite the mounting economic despair. Thomas Wailgum reported in the CIO.com.

The reason for this was that retail winners seek to satisfy their otherwise frustrated customers for the longer term. They also don’t merely do the same things better, but they most often do different things with their businesses. One of the features found was the emphasis on customer centricity practiced by the retailers. Seventy percent of the respondents reported that employee-facing tools and technologies had at least some priority in their strategy to drive customer satisfaction, versus only 67% in a similar study done in 2007. Also, 85% of respondents said that customer-facing tools had at least some priority in their strategy to drive customer satisfaction.
The perception and importance that winning retailers place on enabling their customers (and employees) with technology tools is evident from the survey data: 93 percent of retail winners say there's opportunity in adding customer-facing self-service technologies, versus just 33 percent of retail laggards. In addition, the laggards identified by the survey data appear to be "fighting a death spiral" against new IT-enabled technologies.

Below are the technologies deployed by the retail industries as found in the survey:

- **Modern POS Hardware and Software**: 57 percent of winners have had this in place for more than a year, versus 37 percent of average performers.

- **Customer Facing Technology Touch Points**: In use by 40 percent of winners versus 20 percent of laggards.

- **Distributed Order Management**: In use by 36 percent of winners versus 7 percent of laggards.

- **Self-Service Price Checks**: In use by 28 percent of winners versus 13 percent of laggards.

- **Contactless Payments**: Used by 15 percent of winners versus 6 percent of average performers and no (zero) laggards.

- **In-store Rewards and Coupons**: In use by 46 percent of winners versus 27 percent of laggards.
• **Cross-channel Customer and inventory Synchronisation:** Used by 20 percent of winners versus 12 percent of average performers.

### 3.2 Land Administration in Malaysia

The government of Malaysia through its Ministry of Natural Resources and Environment has embarked on the National Land Administration System called e-Tanah which is claimed to be customer-centric.

As an example, the concept of Single Point of Contact (SPOC) is designed to function as an entry point for all land and land-related transactions which are presented at the land office, viz:

- **Customer Centric Organisation** - customers' satisfaction priority.
- **Single Service Counter** - Process Reorientation through one stop centralised counter functionality
- **Customer Service Management** - assisting the public to obtain Land Office services and serve as single contact point for all businesses
- **Multiple Access Channel** - facilitate public to interact with Land Office, i.e. e-payment
- **Integration among the systems** - quick and easy retrieval of data, i.e. e-search

The development of the e-Tanah pilot system in Penang started in October 2005 and will take 2 years to be
completed. The roll-out of the system to all states in Peninsular Malaysia is approximately by end of 2008-2010. The public in Penang would be able to use the online system once the Final Acceptance Test (FAT) is completed in October 2007.

3.3 Winners of the 3rd Annual Customer Innovation Awards (2008)

The Customer Innovation Awards program is an annual competition, which recognises outstanding companies for their use of technology to deliver innovative customer service in highly dynamic environments.

Six of the eight companies honored this year are from Europe which included Belgacom, BT, Lekane, Philip Morris International, Sky and UniCredit Global Information Services while two are from the US and they are AT&T and Stream Energy. Each company used technology innovatively to streamline and optimise customer service. The companies were chosen for transforming their customer contact centres, increasing customer satisfaction and improving the contact centre's alignment with company business goals.

The three overall criteria that determined the award level were innovation, optimisation and improving the customer experience. The most universal thread among all of the innovators was their ability to link business issues to customer service, achieve optimisation, and treat the contact centre as a strategic opportunity. The organisations also consistently scored high in the "strategic alignment"
between contact centre and customer service goals’ category. The highest order is a 4-Star rank followed by 3-Star.

Details of the finalists are as follows:

- Belgacom, a 4-Star winner, is the Belgian provider in the field of integrated telecommunications services. Belgacom scored well by balancing service-to-sales conversion while optimising its customer service organisation. Belgacom used a variety of key technologies to improve the customer experience:
  - an intelligent Customer Front Door (iCFD) that anticipates customer needs, rather than forcing customers into an automated system that is singularly focused on cost containment.
  - Customer satisfaction increased 10 percent and, at the same time revenue generating capacity increased 3 percent.

- BT, a 4-Star winner, is one of the leading Global Communications providers, operating in 170 countries, with over 30,000 contact centre positions within the company, and more than 100,000 contact centre positions managed for its clients. BT undertook a transformational programme to improve the overall customer experience through the use of:
- An agile, global unified communication infrastructure using IP technology and the Genesys SIP (Session Initiation Protocol) Server at the core of the solution. BT was deemed outstanding in extending the boundaries of each contact centre and creating global virtualisation across all media.

- Its customer benefits include intelligent routing that leverages the best BT resources and the integration of true blended multimedia channels.

- Lekane, a 3-Star winner, based in Finland, produces software to mobilise and expand the contact centre and support mobility. The Nordic leading telecommunications company created the contact centre to reach mobile and field service staff, while managing their availability and presence. Lekane was noted for extending access to experts outside the contact centre to streamline and optimise customer service.

- Philip Morris International, a 3-star winner, based in Lausanne, Switzerland, is the leading international tobacco company. Philip Morris, along with its partner Orange Business Services, leveraged unified communications technology to provide collaboration,
rich presence, and streamlining of employee communications.

- its optimisation capabilities utilised the Genesys Enterprise Telephony Solution (GETS), a platform which provided employees with seamless control of their desktop phones via the computer, and gave information workers the ability to access availability and presence information at their Corporate Headquarters in Lausanne, Switzerland and in branch offices in Paris, the UK, Hong Kong, and Melbourne, Australia.

- Sky, a 3-Star winner, is the UK's largest provider of Pay-TV, Telephony and Broadband products. Sky has leveraged IP telephony and virtualisation to create a solution that can dynamically route customer interactions and enable flexible changes in organisational processes.

  - Genesys SIP (Session Initiation Protocol) Server extends the contact centre across multiple sites. This allowed for a more consistent experience across internal operations and centres of outsourcing, as well as the ability to monitor the global in-house and outsourced operations.
UniCredit Global Information Services, a 3-Star winner, is the ICT Company of one of the largest financial services organisations in Europe (UniCredit Group) with more than 40 million customers in 23 European countries and representative offices in 27 other markets.

- Created a highly flexible IT environment that successfully met both business and customer needs across its pan-European operations, including extending customer service to its multiple branch offices by leveraging business process routing and SIP technology to serve multiple product lines, business units, and languages.

Stream Energy, a 4-Star winner, is one of the largest privately held participants in the Texas deregulated electricity market, with roughly 300,000 residential customers. Stream Energy was best noted by the judges for its strategic use of customer service, which cut across self-service and assisted service to create a seamless customer experience. Stream Energy also created a strategic environment to bring together a wide range of multimedia, live and assisted service.

AT&T, a 3-Star winner, is a publicly-traded, San Antonio-based telecommunications company and the largest provider of wireless in the U.S. with 67.3
million customers and 302,000 employees. AT&T scored extremely well in optimising the customer experience and using IP to enable virtualisation. AT&T’s use of technology not only allowed it to extend the boundaries of the contact centre, but also created consistent business processes and was considered by the judges to be the most highly-scaled environment.

3.4 UTM's Latest Initiative to Boost Students' Experiential Learning

UTM has always been serious in providing students with the best teaching and learning facilities. The use of ICT in this area started with the widespread use of the computers as early as the early 80’s. Later the use of e-Learning became a hit among the lecturers and students.

Recently, in mid 2007, UTM again became the first Malaysian university to launch its very own e-Portfolio for the students. Students are given individual storage to document and store their selected artifacts as evidences in digital formats, and also to make reflections on their learning experiences from first year to their final year.

This e-Portfolio is developed in-house by involving all stakeholders including students and academic advisors. It uses the web-based technology with workflow features that is familiar to all levels of students. Apart from this the e-Portfolio is seen as a service that empowers students to
take charge of their learning activities in campus as well as facilitating them to chart their future goals and undertakings.

It is beneficial to all the affected stakeholders. Hence, besides helping the students, this customer-centric system also supports the academic advisors in their advising capacities, the university administrators in maintaining students' performance as well as informing parents of their childrens' achievements. Potential employers can also be given access by students to facilitate them in finding the right jobs.

4.0 SUMMARY

From the above cases, several ICT technologies have been mentioned and these can be summarised as follows:

- Customer Facing Technology Touch Points, including RFID, bar code system, integrated inventory systems, etc.
- Distributed Order Management which is part of Customer Relationship Management (CRM), Supply Chain Management (SCM) and Enterprise Resource Planning (ERP).
- Self-Service Price Checks using bar code system or RFID or other sensor-based technologies
- Contactless Payments utilises wireless telecommunications and internet connectivity with receiving banks and the organisations' internal accounting systems
- In-store Rewards and Coupons which is part of data warehousing and business intelligence systems
• Cross-channel Customer and inventory Synchronisation involves sophisticated systems integration of all hardware, software and networking applications and technologies

• Dynamic Contact Centres uses a lot of unified communications and virtualisation technologies as well as Voice over Internet Protocol (VoIP)

In conclusion, critical customer self-service success factors depend upon the following:

• Remove humans from routine business processes to reduce the risk of error
• Link customers’ systems directly into the organisation’s to increase efficiencies
• Listen to what customers want and need
• Gear the systems to customers’ level of tech savvy.

Although ICT is important, what is more important is the human touch rather than the high-tech in the customer-provider relationship after all we are humans.
Biodata

Wardah Zainal Abidin, currently an Associate Professor at Faculty of Computer Science & Information Systems, Universiti Teknologi Malaysia (UTM), Skudai. She holds a Masters of Science in Computer Science from UTM, Skudai in 1985. In 1982, she was awarded Gold Medal by IBM World Corporation as the Best Student while pursuing her Advanced Diploma in Computer Science at UTM, Skudai. She graduated in 1981 with a Bachelor of Science (Honours) in Pharmacology from Universiti Kebangsaan Malaysia, Bangi.

Her fields of specialisation include Policy Management in ICT Governance, Information Systems Education, Strategic Information Systems, Vocational Training Management and Skill based IT training & Career Development. She is also a professional member of Association of Computing and Machinery (ACM) and International Association of Software Architects (IASA), a member of Malaysian National Computer Confederation, Persatuan Linguistik Malaysia and Persatuan Penterjemahan Malaysia.

During her working years as a UTM lecturer, she also held positions in the national/international representation. Among them as an External Verifying Officer, Technical Advisor Committee (ICT) and Assessment Officer: Accreditation for Prior Achievements (JPK, Ministry of Human Resource).

Assoc. Professor Wardah was involved in various consultancy projects including “Development of Training Manual for NOSS I-031 and Basic Instructor’s Manual” (MLVK, Min. of Human Resource) as a Project Team Manager; Workshop on “Occupational Analysis for the ICT Industry” (MLVK, Min. of Human Resource) as a Facilitator; Workshop on
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Presenter

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Topic: Researcher ID: A New Way To Address Author Name Ambiguity
ResearcherID: A New Way To Address Author Name Ambiguity

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Abstract

Author name misidentification and ambiguity have always been an issue in database search for researchers, administrators and information professionals. Correctly and accurately recognizing each individual researcher with their scholarly works becomes important for them to quantify their research contributions, which have key impact to their career. ResearcherID, a new initiative from Thomson Reuters, has provided a secure, open registry system that allows the research community to identify their works and control how their information is shared with peers around the world. ResearcherID not only offers access to standardised and clarified author names and citation information in a global, multidisciplinary scholarly research community; it also provides an opportunity to manage public presentation of personal citation metrics.
Introduction

The availability of data, search and discovery systems, communication and email systems, blogs, wikis, and other Web tools have significantly impacted the research process and collaboration among the global research community. This new ecosystem has enabled an increase in scientific output. Given this increase in scholarly output and global networks of collaboration, it is critical that the individual researcher receives attribution for their scholarship.

The link between the researcher and their scholarly output is important for the individual researcher, their organisation affiliations, and public and private funding agencies. Tenure, funding, collaboration, and recognition rely on this link. The connection of effort and results becomes the enabler for assessment, planning, and benchmarking for research teams, academic departments and institutions, and funding agencies.

The research community has been very aware of the issues around identification, particularly individual identification. This is because the global issues of identity have impacted the researcher through their career - for attribution and discovery. Recognising this issue, Thomson Reuters worked with researchers, institutions, and development partners to understand name ambiguity, identity, and attribution issues. This research highlighted researchers concerns about the impact on the success of their research and careers.

Over the last few years Thomson Reuters has enhanced the Web of Science with features that make it easy for researchers to find their works and the works of another. The first enhancement to the Web of Science was Author Finder, a feature that presents articles after the user...
has entered an author name and selected from possible affiliations and subject areas. The second enhancement focused on name disambiguation, *Distinct Author Set*. Using this feature, users can enter the name of an author and view clusters of articles that were likely written by the same person.

The most recent initiative from Thomson Reuters to address name authority, identity, ambiguity, and attribution issues is *ResearcherID*. ResearcherID is a secure, open registry system that allows the research community to identify their works and control how their information is shared with colleagues around the world. ResearcherID assigns a unique identifier that allows the research to create a one-to-one relationship with their scholarly output.

The ResearcherID registry can be used by sponsoring publishers, societies, associations, academic institutions, corporations, and others who will be able to invite their authors and researchers to create and maintain registry records and to integrate functionality into their systems. The first sponsoring application is the *ISI Web of Knowledge* where all 20 million users are invited to receive a unique identifier and create profile of contact information. ISI Web of Knowledge allows researchers at different stages of their career to create and maintain a profile and list of their scholarly output including journal articles, patents, books, thesis, conference proceedings, book chapters, and generic references. The system allows the user to view citation metrics for cited items in their publication list.

As a freely available website, [http://www.researcherid.com](http://www.researcherid.com). ResearcherID allows the researcher to publicise their work and to find colleagues and collaborators. The researcher has the option to make all or part of their profile, publication list, and citation metrics available to the public.
Existing Issues in Database Search for Researchers

With the outburst of international research works and the increase of multidisciplinary content, verifying who wrote what has re-emerged as a core problem in scholarly communication and publication. The process of correctly identify authors in database search is imperative to proper attribution of an author and their scholarly works. It is very difficult to search for an author and return the correct single author without adding additional filtering terms such as topic or institution. Some of the general problems encountered include [1, 2]:

1. Authors share first and last name (e.g. John Smith, Lee KK, Mohamed Ali)
2. Name variations (i.e. the middle initial of a name may or may not be included)
3. Author names can change (e.g. women that change their last name after getting married)
4. Inconsistent ordering of names
5. Misspellings of names
6. Variation in spellings for non-Roman names
7. Author names can be truncated or split

The idea of unique author identification in scientific publishing has been around for some time. For instance, The American Mathematical Society has made attempts since 1940 to identify authors of papers listed in the Mathematical Reviews Database. But with the increasing trend of using databases for scientific publishing, it's getting harder to identify authors publishing in many different scientific journals.

With the increase of collaborative works, there is an increasing trend toward the use of electronic databases of scientific information, such as the PubMed database of the National Library of Medicine and the various
databases of the Institute for Scientific Information (ISI). These databases are frequently used for various purposes, such as literature search, topic search, new subject discovery, citation analysis and the peer-review process of papers submitted for publication in scientific journals. Most of the scientific journals now use a Web-based peer-review system that offers editors, peer reviewers, and publishers the capability to check the previous papers published by authors submitting a manuscript for publication consideration [3]. In addition, these databases are also exploited in an attempt to select potential speakers for scientific conferences and to identify possible collaborators for a multi-centre study, as well as in the process of evaluating the research productivity of scientists [3].

However, it is commonly known that a considerable proportion of authors share the same last name and first initial. Authors of scientific publications do not frequently use their middle initial, which contributes to the confusion regarding the assignment of publications to the appropriate author.

One-fifth of the scientific literature indexed in Web of Science, Science Citation Index Expanded, are publications from China, Japan and Korea. China Ministry of Public Security estimates that 85% of entire China's population (1.1 billion) shares just 129 surnames. The inconsistent naming rules for Asian names from various publishers make the author indexing more confusing. These issues are also bothering Japanese and Korean authors. As a result, it becomes more challenging to identify Asian authors [4].

Misidentification of authors in database search can affect career advancement, tenure, the academic review process, identification and attribution of one's scholarly works for funding, reporting research discoveries and accomplishments to the scientific community, etc.
Creating unique author identification numbers would therefore help authors as one could then measure reliably the citations of individual papers or authors, rather than just relying on a journal’s impact factor as the sole measure of contribution.

**What are the existing remedies?**

Recognising the importance of unique authorship identity, Web of Science has developed some tools to assist users in locating the correct author:

1. **Author Finder:** This is a 4-step wizard that assists user in finding the correct author and pulling out his/her publications by filtering them based on name variants, subject area, and associated institutions.

2. **Distinct Author Sets:** The distinct author sets feature is a discovery tool that displays sets of papers likely written by the same person. All sets are created by the Distinct Author Identification System, which uses citation data to create sets of articles written by an author.

Although these tools effectively help to identify publications most likely written by a unique author, author ambiguity problem will remain if any two authors having similar last name and initial working on same institute and subject area. It is also not easy for the tools to identify misspelling or variation of names.

**What is the Solution?**

Thomson Reuters recognises the need for the creation of a Researcher Registry, and has worked with our customers in developing a solution to address their pain points in proper author identification.
Vice President of Product Development at Scientific business of Thomson Reuters found out from customers’ feedback that "researchers expressed the need for a place to manage their professional profile, which needs to be free, open to all their colleagues, yet with total control over their own privacy."

Thomson Reuters has therefore opened up a new web service called ResearcherID.com (www.researcherid.com) that allows researchers to establish their own identities and, with some restrictions, to identify their writings. ResearcherID is a open system (outside of ISI Web of Knowledge) that allows individual researchers to register for a unique, persistent identification number and deposit a small set of metadata (name, current institution, email address, etc.).

The researcher registry has been designed to be accessible by organisations supporting the researcher community (societies, publishers, ISI Web of Knowledge, ResearchSoft, and ScholarOne), and providing the researcher with additional services including publication list creation, co-author look-up and sharing tools. Accessibility to other organisations will soon be enhanced with release of standard web service API.

**ResearcherID, what is it?**

ResearcherID is a unique Web environment enables researchers to create stable personal identifiers to present their works and manage public presentation of their personal metrics. Each individual identification (ID) number acts as a digital "calling card" that the researcher can place anywhere, such as a personal home page, a CV, or a university page. The identifier links to a personal workspace that automatically updates citation data, user-generated tags and keywords, and professional information that can be shared with the public or kept for personal
monitoring. ResearcherID.com ensures an accurate record of a researcher’s output and attribution, providing a gateway for colleagues to pinpoint not only that researcher’s published work, but also the researcher as a potential collaborator.

Currently, there are two methods for registering for a ResearcherID account: Requesting invitation through the ResearcherID site (Figure 1); Registering through link in ISI Web of Knowledge (Figure 2). To use the ResearcherID service, a researcher registers at the site and receives a unique alphanumeric identification that includes the year of registration. Once registered, users can build custom profiles, upload lists of their publications, or build publication lists by searching Web of Science and ISI Web of Knowledge. Once created, the ResearcherID will automatically generate citation metrics based on the publication list, i.e., add counts of the times other scholars have cited works. Members have total control over their privacy settings, and can change these settings at any time through ResearcherID’s "Manage My Profile" feature. Since Thomson Reuters is promoting the service as an opportunity for collaboration among scientists, the greater the details available, the more other researchers can share. Even non-registered users can search the registry and view public profiles. Such web interface will allow members and non-members to search the registry for collaborators, speakers, reviewers, etc.

Registrants can get citations information for those publications uploaded from Web of Science. Registrants can also add individual entries or upload bibliographies on their own, via the RIS format. At present, there is no way to correct a bibliographic citation except deleting the entire entry and re-entering it, but registrants can edit their profiles at will. Registrants can also enter keywords to describe their work.
Anyone can search the Registry, either by entering a ResearcherID, if known, or by searching for last name and first initial combination, keywords, or institution (Figure 3). They can also click on a keyword from a keyword list on the homepage (Figure 4).

Currently the features offer by ResearcherID includes:

- Searching the registry: ResearcherID allows for search of registry by a combination of name, institution, or keyword. Institution and keyword search support auto suggest. One can also browse using our keyword tag cloud feature.

- Persistent URL to profile: Members are provided with a unique, persistent URL that they can use as a "calling card" for linking directly to their profile from email signature or by placing it on institutional pages, personal homepages, resumes, articles, and blogs.

- Publication list capability: Web of Knowledge subscribers can build a publication list with times cited information and DOI's (where available) by searching Web of Science or ISI Web of Knowledge content through ResearcherID. All members can upload publication histories outside of the ISI Web of Knowledge authenticated environment into ResearcherID in RIS format, allowing for easier creation of publication lists.

- Citation Metrics: The system automatically generates citation metrics from the citation data on your publication list (refer to Figure 5):
  - H-index
  - Citation distribution per year graph
  - Total Times Cited count
  - Average Times Cited count
  - ResearcherID will automatically update times cited counts and citation metrics as data is updated in Web of Science
• Unicode (UTF8) support
• ResearcherID Labs: The ResearcherID Labs is an interactive and collaborative workspace to discover and display who is citing your work and where your collaborators work and live.
  o The Citing Articles Network visually displays information on papers citing the researcher’s work, and analysed by author, category, country, institution, year, and map (refer to Figure 6).
  o The Collaborative Network displays information on a researcher’s collaborators, and analysed by author, category, country (refer to Figure 7), institution, and map.

How ResearcherID addresses author ambiguity problem?

Designed as a web-based system, ResearcherID allocates an ID during a one-time registration which can be expressly associated with a researcher’s published works without confusion over nomenclature or any changes in institutional affiliations during one’s career.

ResearcherID.com resolves any ambiguity surrounding published works and provides a safe space for virtual collaboration. ResearcherID is helping to solve ambiguity problem by giving researcher’s control in identification of their works and by providing a tool that explicitly links the author to their publications through use of ResearcherID number.
Conclusion

Proper identification and attribution is paramount in scientific research. ResearcherID addresses the global issues around author name ambiguity, identification, and attribution. ResearcherID allows researchers to register for a unique identifier and provides a space for researchers to build a publication list and analyse their co-author and citing relationships through the citation metrics and labs functionality. In addition, ResearcherID provides users a way to find collaborators and peers across the globe.

For more information on how to register with ResearcherID, please visit: http://www.researcherid.com.
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Figures

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References


Biodata

Dr. Lim Khee Hiang joined Thomson Reuters as Associate Manager taking care of Customer Education. He is located in Singapore office and providing training and customer education to all customers in South East Asia, South Asia, Hong Kong and Taiwan.

Dr. Lim has 8 years of experience in research and academics. Prior joining Thomson Reuters, he was a Postdoctoral Research Fellow at the Biomedical Engineering Centre, Auckland University of Technology, New Zealand where he supervised 6 Ph.D. and Masters students. He actively involves in research projects at Nanyang Technological University, Singapore as well as St. Patrick Hospital and Health Sciences Centre, USA.

Khee Hiang has published more than 54 publications in international journals, transactions and proceedings in the areas of Heart Valve Engineering, Cardiovascular Surgery, Heart Valve Disease, Clinical Anatomy, Biomechanics and Finite Element Modeling. He also filed a full patent in 2006 under the Patent Cooperation Treaty.