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CONTENTS

Sr. No.	TITLE & NAME OF THE AUTHOR (S)	Page No.
1.	SOCIO-ECONOMIC INFLUENCE OF SHARI'AH ON CONSUMERS' MOTIVES AND PERCEPTION IN ZAMFARA STATE, NIGERIA DR. HALIRU BALA	1
2.	EFFECTIVENESS OF COMPUTER ASSISTED INSTRUCTION IN RELATION TO THE LEARNING OUTCOMES OF THE ENGINEERING MANAGEMENT STUDENTS OF UNIVERSITY X MA. TEODORA E. GUTIERREZ	4
3.	IDENTIFYING TECHNOLOGICAL PARAMETERS EFFECTIVE ON COMPETITIVENESS OF SMALL AND MEDIUM-SIZED RESIN COMPANIES ACCORDING TO UNIDO MODEL: CASE STUDY OF IRAN KEATON POLYESTER MANUFACTURING COMPANY EHSAN GHASEMI, SEYED REZA HEJAZI, ABOLGHASEM ARABIOUN & REZA ALIBAKHSHI	6
4.	IMPACT OF ISLAMIC BUSINESS ETHICS ON FAMILY CONSUMPTION DECISION MAKING IN ZAMFARA STATE, NIGERIA DR. HALIRU BALA	12
5.	ETHICAL ISSUES AND CONSUMER PERCEPTION ABOUT BRANDED AND UNBRANDED MILK PRODUCTS: THE EMERGING SCENARIO DR. ASHOK AIMA & NARESH SHARMA	15
6.	SOFTWARE PROJECT MANAGEMENT - BEST PRACTICES DR. K. A. PARTHASARATHY	19
7.	RECALLING ANCIENT WISDOM FOR A SUSTAINABLE DEVELOPMENT DR. PADMA SHANKAR	23
8.	RADIO FREQUENCY IDENTIFICATION (RFID) TANAJI D. DABADE, DR. SHIVAJI U. GAWADE & ALEKHA CHANDRA PANDA	27
9.	SERVICE QUALITY MODELS IN HEALTHCARE - A REVIEW (1990-2010) K. VIDHYA, DR. C. SAMUDHRA RAJKUMAR & DR. K. TAMILIYOTHI	34
10.	A I R E P: A NOVEL SCALED MULTIDIMENSIONAL QUANTITATIVE RULES GENERATION APPROACH SAPNA JAIN, DR. M. AFSHAR ALAM & DR. RANJT BISWAS	45
11.	AN ANALYSIS OF ONLINE IDENTITY MANAGEMENT TECHNIQUES APARAJITA PANDEY & DR. JATINDERKUMAR R. SAINI	53
12.	PAPR REDUCTION OF OFDM BASED ON ADAPTIVE ACTIVE CONSTELLATION EXTENSION NEELAM DEWANGAN & MANGAL SINGH	56
13.	ANALYZING THE OUTPERFORMING SECTOR IN THE VOLATILE MARKET DR. SANDEEP MALU, DR. UTTAM RAO JAGTAP & RAHUL DEO	60
14.	AN ANALYTICAL STUDY OF JOB STRESS AMONG SOFTWARE PROFESSIONALS IN INDIA DR. SURENDRA KUMAR	65
15.	PROCESS FRAMEWORK FOR BUSINESS VALUE ENHANCEMENT BY IMPROVING OPERATIONAL EFFICIENCY RAMAKRISHNAN. N	71
16.	AN OVERVIEW OF SUPPLY CHAIN MANAGEMENT PRACTICES IN INDIAN AUTOMOBILE SECTOR R.VENKATESHWAR RAO	75
17.	AN EMPIRICAL STUDY OF BRAND PREFERENCE OF MOBILE PHONES AMONG COLLEGE AND UNIVERSITY STUDENTS DR. DINESH KUMAR	81
18.	ICT IN BANKING SECTOR: DISASTER AND RECOVERY OF INFORMATION GAGAN DEEP, SANJEEV KUMAR & ROHIT KUMAR	86
19.	CREDIT CARDS AND ITS IMPACT ON BUYING BEHAVIOUR: A STUDY WITH REFERENCE TO RURAL MARKET P.MANIVANNAN	89
20.	EMERGING APPLICATIONS AND SECURITY FOR VoIP: A STUDY HEMA JANDSALAR & DR. B. S. JANGRA	93
21.	SUCCESSION PLANNING IN INDIAN BANKING SYSTEM: A STUDY CONDUCTED AMONG BANK OFFICERS OF COIMBATORE DR. RUPA GUNASEELAN & S.DHANA BAGIYAM	96
22.	A CONCEPTUAL STRUCTURE FOR KNOWLEDGE MANAGEMENT MODEL IN HIERARCHICAL DISTRIBUTED ENVIRONMENT: CASE STUDY OF KNOWLEDGE SHARING AMONG DIFFERENT GOVERNMENT ORGANIZATION WORKING FOR PLANNING AND FACILITATING WATER RESOURCES IN UTTARAKHAND STATE JATIN PANDEY & DARSHANA PATHAK JOSHI	99
23.	A DNA-BASED ALGORITHM FOR MINIMUM SPANNING TREE PROBLEM USING TEMPERATURE GRADIENT TECHNIQUE B.S.E.ZORAIDA	102
24.	MARKET BASKET ANALYSIS: A DATA MINING TOOL FOR MAXIMIZING SALES & CUSTOMER SUPPORT KALPANA BABASO SALUNKHE, MURLIDHAR S. DHANAWADE & SACHIN PATIL	107
25.	FAULT DETECTION IN NETWORKS BASED ON DYNAMIC INTERVAL BASED ACTIVE PROBING BANUMATHI R	110
26.	ISSUES AND CHALLENGES IN ELECTRONIC WASTE DR. KUNTAL PATEL & NIRBHAY MEHTA	113
27.	STUDY ON CSR OF WIPRO, TATA & RIL SHWETA PATEL & ZARNA PATEL	116
28.	EMPOWERING RURAL WOMEN – ROLE OF MICROFINANCE DR. NANU LUNAVATH	119
29.	ROLE OF E-LEARNING IN EDUCATION: A STUDY OF UNIVERSITY OF JAMMU ANJU THAPA	126
30.	ADVERTISING: DO THEY HELP CONSUMERS IN MAKING SOUND PURCHASE DECISIONS? PINKI	130
	REQUEST FOR FEEDBACK	132

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AN ANALYSIS OF ONLINE IDENTITY MANAGEMENT TECHNIQUES

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ABSTRACT

Internet was originally designed to be used within a close community where the identity of users was well known and pre-established. Hence the need for managing the identity of individuals was not there. The modernisation and advancement of technology in the internet environment has resulted in the digitisation of personal information which has changed the ways of identifying persons and managing relations with them. In the present times identity on the internet has become virtual and is represented merely by a user account on a website or an email address or a mobile phone number etc. As the number of users on the internet grows so are the possibilities of misusing these identities by others. The existing identity management mechanisms need to be reworked in the light of the current scenario. This paper presents the different forms of Identity Management techniques which are being used in the online environment to prevent the loss of trust and to provide a sense of safety, security & certainty to Netizens about the identity of their communicating partners in the cyber space.

KEYWORDS

Identity Management, Internet Security, Privacy.

INTRODUCTION

During the first twenty years of its existence, the World Wide Web had a profound effect on us. While the Internet has been with us for more than 40 years, the Web is responsible for its exponential growth with more than 2 billion users worldwide accessing more than 22 billion web pages [1]. Social Networks like Facebook and Twitter are attracting more and more users. There is much more to come such as Cloud Computing which will increase the information processing and data exchange manifolds.

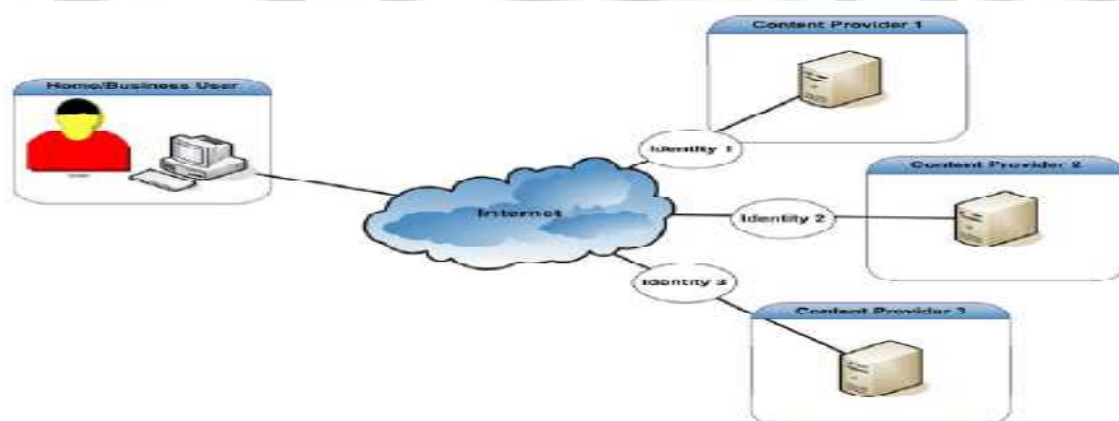
However, while looking at this amazing new world and getting excited by the use of previously unimagined devices, people are confused and concerned by the ease with which our data can be stolen, our profiles used for commercial purposes without our consent, our identity stolen or our privacy invaded. The trustworthiness of our digitized world is at stake.

The identity revolution is already becoming part of our daily lives. People are eager to share information with their “friends” in social networks like Facebook, in chat rooms, or in Second Life. Customers take advantage of the numerous bonus cards that are made available. Video surveillance is becoming the rule. In several countries, traditional ID documents are being replaced by biometric passports with RFID technologies. This raises several privacy issues and might actually even result in changing the perception of the concept of privacy itself, in particular by the younger generation. In the information society, our (partial) identities become the illusionary masks that we choose –or that we are assigned– to interplay and communicate with each other. Rights, obligations, responsibilities, even reputation are increasingly associated with these masks. On one hand, these masks become the key to access restricted information and to use services. On the other hand, in case of a fraud or negative reputation, the owner of such a mask can't be penalized: doors remain closed, access to services is denied. Hence the current preoccupying growth of impersonation, identity-theft and other identity-related crimes is seen.

ONLINE IDENTITY

An Online Identity or Internet Identity is a social identity that an Internet user establishes online in online communities, with other people and web sites. As depicted in Fig. 1, Identity Management on the internet today is disorganized. There are two basic reasons for this. First the content providers and the internet users continue to use identity management tools and techniques that worked well with hard wired networks but on Internet, which is a global network, these tools and techniques do not work the same way as the netizens activities are context based. The Identity information needed by each content provider depends upon the perceived needs of the provider and the types of services or contents delivered. This leads to the second reason-Lack of uniformity in how the content providers implement Identity Management. Since approaches to Identity management are based on requirements as viewed by each individual content provider, the Internet is becoming a disorganized, unmanageable, insecure computing environment.

FIG.1: IDENTITY MANAGEMENT ON THE INTERNET TODAY [2]



Each content provider that requires information about the incoming user collects data and stores it for future use. User IDs and passwords might be different as the user moves from site to site. Because users have been trained to provide their information whenever an apparent content provider requests it, phishing attacks often successfully encourage users to provide personal information to Internet criminals. Short of criminal activity, content providers might also distribute personal information without the owner's knowledge or consent.

To summarize the current state of the Internet according to Cameron [2],

1. There's no way to know who and what you're connecting to
2. There's no way to evaluate the authenticity of sites visited
3. There's no way of knowing when information is disclosed to illegitimate partners

THE SEVEN LAWS OF IDENTITY

Kim Cameron, Identity and Access Architect of Microsoft Corporation laid out seven Laws of Identity in his paper, "The Laws of Identity," [2].

1. Technical identity systems must only reveal information identifying a user with the user's consent.
2. The solution that discloses the least amount of identifying information and best limits its use is the most stable long term solution.
3. Digital identity systems must be designed so the disclosure of identifying information is limited to parties having a necessary and justifiable place in a given identity relationship.
4. A universal identity system must support both "omni-directional" identifiers for use by public entities and "unidirectional" identifiers for use by private entities, thus facilitating discovery while preventing unnecessary release of correlation handles.
5. A universal identity system must channel and enable the inter-working of multiple identity technologies run by multiple identity providers.
6. The universal identity metasystem must define the human user to be a component of the distributed system integrated through unambiguous human-machine communication mechanisms offering protection against identity attacks.
7. The unifying identity meta-system must guarantee its users a simple, consistent experience while enabling separation of contexts through multiple operators and technologies.

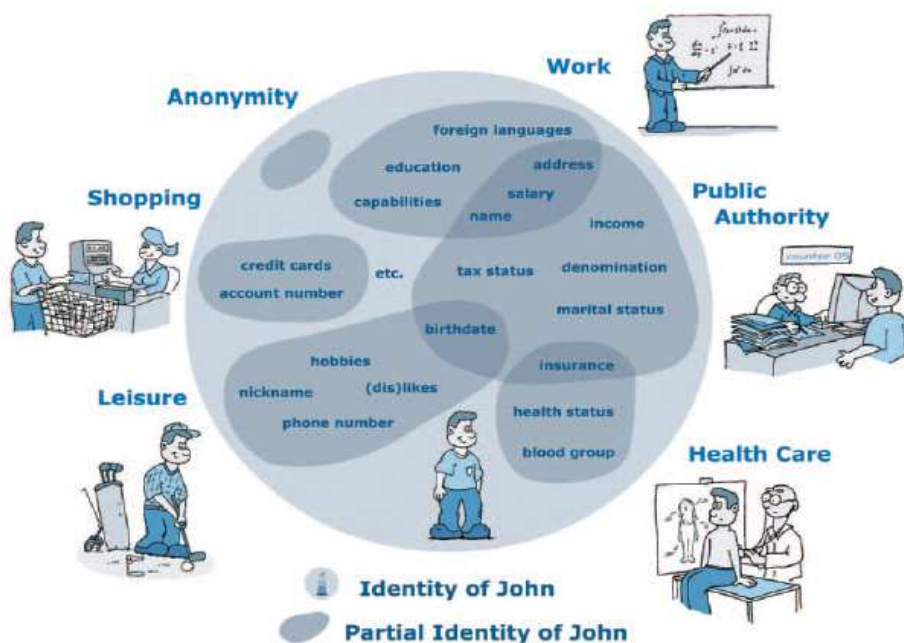
To summarize the laws, digital identity is based on context. Because of the number of content providers, there are thousands of contextual variations. A solution is required that allows users to traverse these variations with a simple identity system within which they maintain complete control of their personal information. They must also have adequate assurance that they are not victims of online criminal activities.

OVERVIEW ON IDM SYSTEMS

In the digital world a person can be represented by sets of data (attributes) which can be managed by technical means also called digital identities. Depending upon the situation and the context only subsets of these attributes are needed to represent a person both in the physical and the digital worlds which are called (Digital) Partial Identities [3]. An IDM system provides the tools for managing these partial identities in the digital world. A person uses different partial identities for work, for leisure activities or for dealing with a bank or an online store [3].

Some partial identities containing the information which other communication partners typically know about a person are shown in Fig. 2.

FIG.2: PARTIAL IDENTITIES [3]



TYPES OF IDM SYSTEMS

According to the EU project of FIDIS [4] there are three types of IDM systems.

Identity Management Systems for account management, especially implementing an AAA infrastructure (authentication, authorization and accounting).

Identity management Systems for profiling user data by an organization, for e.g. data warehouses which support personalized services or the analysis of customer behavior.

Identity management Systems for user-controlled context dependent role and pseudonym management.

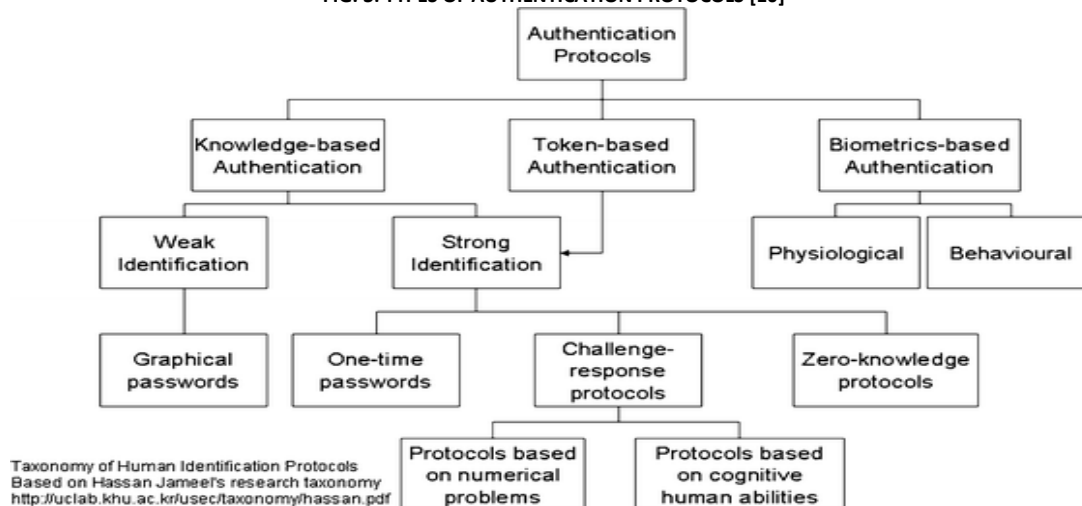
Centralized Identity Management Systems

Identity management systems of the first two types above are implemented in a centralized way. The main goal of their usage is reliable identification of persons or reliable assignment of attributes to a person while the second goal of identity management systems, the controlled pseudonymity, is neglected. They store all personal data related to partial identities on the server side. The most simple form is a stand-alone system with only one partial-identity-database and usable at this server and for the applications provided to users. This simple approach of federated identity management became of great interest during the last years because it allows users to manage partial identities for different applications and with different communication partners. It has the following features:-

1. Identity Provisioning: Based on one single registration at one service or so-called identity provider different services at different servers can create user accounts for partial identities of the identity this registration is associated with.

2. Single-Sign-On: Based on the login to one user account at one service a user is able to use his user accounts at different services.
3. Attribute exchange: The linkability of attributes to a partial identity at one service can be exchanged with other services. The different types of centralized IDM systems as presented by Jameel are depicted in Fig. 3.

FIG. 3: TYPES OF AUTHENTICATION PROTOCOLS [10]



Decentralized Identity Management

Type 3 Identity management Systems are organized in a decentralized, user-oriented way and try to reach both aspects of identity management, controlled pseudonymity and reliability of users. This section gives an overview in basic principles and techniques used. Personal data is initially stored under the control of the user. Then, the user can decide, whether, to whom and for which purpose he wants to disclose personal data. This requires a network capable of keeping communication partners anonymous. Further, pseudonyms must be used in order to control linkability of personal data disclosed. In order to not only preserve privacy as much as possible, but also enable personal data to be certified by third parties, an additional infrastructure is needed.

In the user controlled identity management, the user manages his/her partial identities according to specific situations and contexts. This means choosing and developing appropriate partial identities with respect to the current application needs. They enable the users to handle the plurality of accounts and passwords. Not always the real name of the user is required. Instead; different pseudonyms could be used to prevent undesired context-spanning linkage and profiling by other parties. User-controlled identity management systems do not only offer pseudonyms, but also keep track of which personal data have been disclosed to whom.[4] Thus, the user can see which personal information the various communication partners have received in earlier transactions. To know who knows what about oneself is necessary for one's informational privacy. At present, only very few people have a look at the privacy policies of online shops even though they contain important information, namely how the provider promises to treat the personal users' data, e.g., for which purpose data are stored or when they will be deleted. The identity management system could analyze them and show the user what is essential for her privacy rights. The user could decide on the basis of this information whether to give consent for data processing, which data to disclose or whether to refrain from interacting with the site at all. Even more sophisticated requirements may be negotiated, e.g., how long the data may be stored, which third parties may get access to personal data for specific purposes, or that the data may only be used if the provider pays for that. The privacy policies would be stored together with the information on disclosed data, like keeping a copy of the general terms and conditions. In several cases the application requirements will not offer many degrees of freedom, so that the users' choices are limited, e.g., in e-government applications. Then the identity management system is still useful to visualize the requirements and to keep track of the data disclosure to enable maximum transparency to the user.

THE CURRENT SCENARIO

There are quite a lot identity management systems which support the users' convenience, e.g., for password management and form filling. The users should be aware of those systems which "manage the identity" on centralized servers: Those providers can monitor all the users' activities and may have their own interests regarding the data. More and more concepts for identity management are being implemented, e.g., by the Liberty Alliance [9], by Microsoft's CardSpace [7] or by the open source project Higgins [8]. All these approaches cover only a part of the functionality described above. In the EC-funded project "PRIME – Privacy and Identity Management for Europe" [5] the full flavors of identity management are being researched and developed [6]. As a specialty their approach uses "private credentials" which enable proving one's authorization without revealing information that may lead to an identification of the individual – as long as there is no misuse. In addition they are looking into ways for users to really exercise their privacy rights, e.g., to get access to check their personal data stored at other parties in the Internet or to withdraw their consent if they are not satisfied anymore with the site processing their data. By empowering the user and increasing transparency, which are the key issues of user-controlled identity management, not only the important right to privacy will be protected. but it can be developed further according to the needs of users of the Internet.

CONCLUSION

New Identity Management Systems should be developed with a strong interaction between social innovation and the development of policy and regulation. Uncontrolled technology development and innovation will lead the Internet and Web to become a jungle where trust is lost, crimes rise and each individual is forced to defend himself with limited tools. Similarly, policy development without awareness of technological developments will throttle innovation and economic growth. If netizens feel threatened, distrustful and hesitant towards new application and services on the Internet, everyone will end up being a loser. Each country should develop a techno-legal system for trust, security and privacy that should be agreeable to global cooperation and boost e-commerce.

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