Chief information officer concept in e countries assignment

The Chief Information Officer (CIO) Concept in E-government: Select Lessons for Developing Countries D. C. Misra* Index Terms Government CIO, CIO Council, CIO Role, CIO Framework, CIO Action Plan ABSTRACT An attempt has been made in this paper to view the Chief Information Officer (CIO) concept worldwide treating him as the prime mover of e-government.

In the global perspective the entry of the Chief Information Officer (CIO) in e-government calculus by incorporating the four dimensions of (i) introduction of CIO's, (ii) human resource development for CIO's, (iii) supporting body for CIO and (iv) role and function of CIO's, for determining the status of e-government in a country is recent and is highlighted. Approaches to the CIO concept in private and public sectors are then distinguished noting that CIO experience in private sector is of limited use to the public sector.

The CIO model in private and public sectors are then briefly described. A dozen countries, namely, 1. United Kingdom, 2. United States, 3. Canada, 4. Japan, 5. Australia, 6. Singapore, 7. Hong Kong SAR, 8. Malta, 9. Botswana, 10. India, 11. Thailand, and 12. Sri Lanka, are selected to learn from, based on research on the Web, their experiences of implementation of CIO concept and their notable contributions to the CIO concept summarized including positioning of the CIO in the organisational structure in the selected countries.

This is followed by a similar exercise in implementing the concept of CIO Council in selected countries. A hypothesis is then advanced that the socio-economic parameters of a country determine the status of ICT sector and E-government in general and the status of CIO in particular but it is a two-way,

reversible relationship, that is, the status of CIO also determines the status of e-government which, in its turn, also determines the status of ICT sector which, in its turn, determines the status of the economy as a whole.

A framework for implementing the CIO concept is then developed based on (a) developing mechanisms to support the CIO so that he can play his assigned role competently, (b) drawing CIO Profile so that we are clear about his qualifications, experience, and other desired qualities and attributes, (c) defining CIO's Role so that we are clear about what to expect from them and CIO's are clear as to what is expected from them, and, above all, (d) undertaking a PEST/SWOT analysis of CIO for developing appropriate strategy, and (e) Training the CIO, by undertaking training needs analysis (TNA), identifying needed knowledge (K), skills (S), attitudes and attributes (A) and other things (Os), developing a training plan, and then executing it repeatedly in a training cycle. Following ten roles for the CIO in the domain of (i) leadership, (ii) e-business plan, (iii) liaison, (iv) contracts, (v) policies and standards, (vi) website, (vii) ICT-related committees, (viii) link officer, (ix) porte parole, and (x) e-government champion, are identified and their key components and sub-components described.

The first seven roles are already prescribed as CIO responsibilities in the ICT Manual for the Civil Service of Republic of Mauritius [27] and the last three are suggested as add-on roles. For implementing the CIO concept in e-government preparation of a CIO framework and for implementing the CIO framework, preparation of a CIO Action Plan in a 10-year perspective are emphasized so that the pace of development of e-government in developing countries is accelerated. The CIO Action Plan is also proposed to consist of (i)

a short-term plan (0-2 years), (ii) a medium-term plan (3-5 years), and (iii) a long term plan (6-10 years) to provide proper short, medium and long-term perspectives for implementation of the CIO concept.

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_____ *Independent E-government Consultant, New Delhi, India (Tel: +91-11-2245 2431, Fax: +91-11-4244 5183, Email: dc_misra[at] hotmail. com. A global perspective the CIO reveals that North America led by the U. S. leads in implementing the CIO concept followed by South-East Asia and the Pacific led by Japan, which is actively promoting the CIO concept. Recently Europe has also joined the U. S. -Japanese efforts in promoting the CIO concept, thus forming a U. S. -Japan-Europe CIO axis. The CIO concept has, however, so far not found any favour with the policy-makers in South Asia the way it has in the U. S. and Japan.

The paper is concluded by drawing select five lessons for the developing countries from the implementation of CIO concept worldwide: (i) There must be a Chief Information Officer (CIO) in each ministry/department or a public sector organization, (ii) The Chief Information Officer (CIO) must be supported by a Chief Information Officer (CIO) Council (iii) An appropriate CIO framework based on (a) socio-economic determinants of e-government and the CIO, (b) oversight by ministry of communications and information technology (c) supporting mechanism like CIO Council, (d) drawing up of CIO profile, (e) CIO role, (f) PEST/SWOT analysis of CIO and (g) training plan for CIO, is required to be developed, (iv) To implement the CIO concept in Ministries/Departments, a long term, say 10 years, CIO Action Plan is required to be prepared and implemented, and (v) E-government champions

are required to be identified and developed, both at the ministerial level as well as at the bureaucratic level. I. INTRODUCTION

The CIO Concept The Chief Information Officer (CIO) concept has gained prominence worldwide, in developed as well as developing countries and in private as well as public sectors. Originating in 1981 in private sector, the same year IBM released the personal computer (PC), the creation of this entity was an explicit recognition of importance of " information' in our lives and it could even be said to have formally heralded the dawn of the present " Information Age. " Since then the CIO has made rapid strides despite many obstacles on the way. Conceived as prime mover of information and communication technology (ICT) generally and e-government in particular, any countries have set up elaborate mechanisms to interact, support and guide him by way of setting up Chief Information Officer (CIO) Councils. A World Bank seminar on the Emerging Role of the CIO held on September 22, 2004, observed: " Traditionally, in most countries, heads of technology departments were responsible for IT projects and use of IT focused on back-office " task automation" for internal efficiencies. However, as ICT in the early 1990s, with the advent of the internet and widespread public connectivity, coupled with pressure for changes in public sector operations and service delivery, governments realized the broader potential for ICT.

With the wider potential for ICT to affect government operations and public relationships the need for policy and strategic leadership that goes beyond technology management emerged and with focus on the fundamental issues of change management and business process reengineering became important. " [1]. Realising his importance, George Mason University, Fairfax,

Virginia, US, is organizing a Global CIO Roundtable conference on October 29, 2007, which will examine the critical role of the government CIO's and e-champions in citizen-centric transformation of the public sector [2]. II. THE CIO: A GLOBAL PERSPECTIVE 2007 Top Ten CIO Countries While the importance of the Chief Information Officer (CIO) has been recognized worldwide, his entry into the e-government calculus is only very recent.

The Institute of E-government of Waseda University in Japan, which came out with its e-government ranking for the first time for 2005, included " CIO' in the e-government calculus as an area containing a set of CIO indicators. In its third year now, the institute has assessed the progress and development of e-government in 32 countries for working out 2007 e-government ranking. [3]. Six areas through 26 indicators were surveyed for 2007 ranking. For the CIO, evaluated indicators were: the introduction of CIOs, Human Resource Development for CIOs, Supporting Body for CIO and Role and Function of CIOs. " 2007 Top Ten CIO Countries may be seen in Table 1. Table 1 2007 Top Ten CIO Countries S. N. CIO RankingCountry 1 2 3 4 5 6 7 8 9 101 2 2 4 4 4 7 9 10United States of America (1) Singapore (3) Canada (2) Japan (4) Korea (5) Taiwan Taiwan (7) Australia (8) Un Malaysia (14) United Kingdom (9) Malaysia Thailand (17) Note: 1. Figures in parentheses indicate 2006 ranking [3] 2. n= 32 countries Source: [2] III. THE CIO MODEL Differences in Approaches to the CIO Concept in Private and Public Sectors The approaches to the CIO concept differ radically in private and public sectors when viewed against half a dozen characteristics of control, orientation, clientage, motivation, working environment, and risk-taking behaviour as shown in Table 2,.

The implication of this distinction in approaches is that the CIO experience in private sector is of limited use to the public sector despite attempts by many to translate the private sector experiences to the public sector. Keeping this limitation in view, it is instructive to have a look at the CIO model in private sector. The CIO Model in Private Sector: Deloitte's CIO Management Framework™ for Government The CIO model in private sector envisages a CIO who is (i) a technically qualified person in information and communication technology (ICT), (ii) reports directly to the CEO, (iii) is assigned a definite budget for attainment of his objectives, and (iv) is responsible for maintaining ICT infrastructure for his company.

Deloitte, a business consultancy, has developed an interesting CIO Management Framework™ for Government in its white paper CIO 2. 0 [4]. Gartner, a consultancy firm suggests a " CIO executive success cycle" having four parts, each representing a habit: shape demand, set expectations, deliver, and lead [5: 5]. The private sector has a " Four Chiefs Model" or " 4C's Model. " These four chiefs are 1. Chief Finance Officer (CFO), 2. Chief Technology Officer (CTO), 3. Chief Information Officer (CIO), and 4. Chief Knowledge Officer (CKO). What is common between these four chiefs is that they report directly to the company chief, that is, the Chief Executive Officer (CEO), at whose level the decision-making " buck stops. The " 4C's" CIO Model in Private Sector is illustrated in Figure 1. Table 2 Differences in Approaches to the CIO Concept in Private and Public Sectors S. N CharacteristicsPrivate Sector Public Sector 1ControlShareholdersVoters 2OrientationResult-orientedProcedure-oriented 3ClienteleCustomerCitizens and Non-citizens 4MotivationProfitService 5Working

EnvironmentCompetitiveMonopoly 6Risk-taking BehaviourRisk-takingRisk-averse Figure 1 The " 4Cs" CIO Model in Private Sector Question of CIO Nomenclature To distinguish him from the private sector entity, the CIO in government has been called by various names like " Public CIO," " Public Sector CIO," " Government CIO (GCIO)" or just " CIO. ".

Some of his functions in government are also being discharged by other entities having different designation like Informatics Officer (IO), Information Technology (IT) Manager, Technical Director (TD), Innovation officer, etc. He has also been jocularly referred to as " Chief Ignorance Officer," and, much worse, as " Career is over. " For our purpose, we shall refer to him simply as, what indeed he is, " Chief Information Officer (CIO)," irrespective of any other designation by which he is known. The CIO Model in Public Sector The CIO Model in Public Sector exists in two versions: 1. The CIO Version 1. 0 (The CIO of pre-Internet era), in which the CIO was known as " Electronic Data Processing (EDP) Manager," usually positioned in a section, responsible for " office automation" and reporting to the sectional head, and 2. The CIO Version 2. (The CIO of the post-Internet era), in which the CIO heads a division, is responsible for organisation-wide introduction and management of information and communication technologies (ICTs) and reports directly to the head of the organisation. These two versions are illustrated in Figure 2 and Figure 3. IV. THE CIO MODEL: LEARNING FROM SELECTED INTERNATIONAL EXPERIENCE Lessons from Selected International Experience It is instructive to have a look at the CIO models, based on research on the Web, in some of the developed as well as some of the developing countries with a view to draw useful lessons from their experiences for developing

countries. A dozen countries were selected for the study: 1. United Kingdom, 2. United States, 3. Canada, 4. Japan, 5. Australia, 6.

Singapore, 7. Hong Kong SAR, 8. Malta, 9. Botswana, 10. India, 11. Thailand, and 12. Sri Lanka. The lessons -notable contribution to the CIO concept- are summarized in Table 3. Positioning of the CIO in the Organisational Structure An important determinant of the importance attached to e-government is the positioning of the national CIO in the organizational structure of the government. The dozen countries studied show four notable models, in order of importance: 1. Prime Minister's Office/Cabinet Secretariat 2. Ministry/Department: (a) IT Ministry/Department, (b) Non-IT Ministry/Department, and 3. Attached or Subordinate Organisation or Agency (Table 4).

The dominant model which emerges here is the positioning of the CIO in an attached/subordinate office/agency. The presumption here is that if the CIO is positioned in Prime Minister's Office, it will show the commitment to e-government at the highest level in government. Figure 2 The CIO Model in Public Sector Version 1. 0 Figure 3 The CIO Model in Public Sector Version 2. 0 Table 3 The CIO Concept: Learning from the Experience of Selected Countries S. N. Country Location of the CIO Lessons (Notable Contribution to the CIO Concept) 1United KingdomCabinet OfficeTop support (Cabinet Office) to the CIO, Excellent focus on serving citizens, Marketing of E-government services [6]. United States of AmericaOffice of Management and Budget (OMB)Best supported CIO in the world, including by legislation, by CIO Councils, Associations and CIO University [7]. 3CanadaTreasury Board of Secretariat (TBS)Excellent technical support to the CIO through CIO

Secretariat, Comprehensive Framework for the CIO [8].

4AustraliaDepartment of Finance and Administration (DFA)Support by the CIO to Information Management Strategy Committee (IMSC), Marketing of E-government services [9]. 5JapanAdministration Management Bureau (AMB)Driving the CIO Concept " worldwide," Preparation of " Optimization Plan" by CIO with the help of technical Assistant CIO [10]. 6SingaporeInfo-Communications Development Authority IDA)Sharp Focus on E-government by the CIO, Excellent citizen-centric services including very high capability for online transactions [11]. 7Hong Kong SARDepartment of Commerce, Industry and Technology (DCIT)Sharp focus by the CIO on Business and Community [12]. 8MaltaOffice of the Prime Minister (OPM)Best Coordinating Role by the CIO [13]. 9BotswanaCabinet (Proposed)A " CIO" proposed under " Mailtamo" Governance Structure [14]. 10IndiaDepartment of Information Technology (DIT), Ministry of Communications and Information Technology (MCIT)Countrywide Network of CIOs and CTOs at National, State and District Levels incorporating both CIO and CTO concepts [15]. 11ThailandMinistry of Science and TechnologyDevelopment of National " Digital Nervous System" (DNS) [16]. 2Sri LankaInformation and Communication Technology Agency of Sri Lanka (ICTA). CIOs as Chief Innovation Officers, eventually becoming Chief Information Officers [17]. Table 4 Positioning of the CIO in Organisational Structure in Selected Countries S. N. Positioning of the CIOCountries 1Prime Minister's Office1. United Kingdom, 2. Malta, 3. Botswana (Proposed) 2Ministry/Department: (a) IT Ministry/Department (b) Non-IT Ministry/Department (a) Nil (b) 1. Australia, 2. Hong Kong SAR 3Attached/Subordinate Office/ Agency1. United States, 2. Canada, 3. Japan,

4. Singapore, 5. India, 6. Thailand V. THE CIO COUNCIL: LEARNING FROM SELECTED INTERNATIONAL EXPERIENCE

The CIO Council, United Kingdom A pioneering effort, this site was launched in July 2005 " to act as a focal point for work of the Government's new CIO Council. " Constituted in January 2005, the Government Chief Information Officer (CIO) council is " the first initiative to bring together CIOs from across all parts of the public sector to address common issues. The website consists of independent sections detailing the work and plans of the various workstreams of the CIO Council. " These are: Government IT Profession, Shared Services, Leading Successful Delivery and IT Strategy and Policy. Check it at [6]. The (Federal) CIO Council, United States

The (Federal) Chief Information Officers (CIO) Council in the United States was established as early as July 16, 1996 by Executive Order 13011, Federal Information Technology. " A charter for the Council was adopted on February 20, 1997 and later codified by the E-Government Act of 2002. " The CIO Council serves as the principal interagency forum for improving practices in the design, modernization, use, sharing, and performance of Federal Government agency information resources. Check it at [18]. The Small Agency CIO Council (SACC), United States It is " comprised of the CIOs from about 90 small, independent federal agencies. The SACC members meet six times a year, discussing the President's Management Agenda, best practices, computer security, and other issues of interest to the community.

Like the " large" CIO Council, the SACC also serves as an effective liaison between the agency CIOs and OMB, ensuring that small, independent

agencies have a forum for discussing OMB guidance and reporting requirements. " Check it at [19]. National Association of State Chief Information Officers (NASCIO), United States NASCIO represents " state chief information officers and information resource executives and managers from the 50 states, six U. S. territories, and the District of Columbia. State members are senior officials from any of the three branches of state government who have executive-level and statewide responsibility for information resource management. " Check it at [20] State CIO Councils in the United States States in the U. S. ave also set up their own CIO Councils, for example, New York State [21] and the state of New Mexico [22]. Government CIO Executive Council, NSW (New South Wales), Australia The NSW Government CIO Executive Council is " the principal forum that provides executive level leadership and decision-making for the development of government-wide information and communications technology strategies [23]. Development of Model Government CIO Councils It is a joint Thailand-Indonesia project co-sponsored by Japan, Philippines, Malaysia, Viet Nam and United States of America under APEC Telecommunication and Information Working Group (TELWG). Check for details at [24].

International Academy of CIO (IAC), Japan This is a unique initiative of Japan, with U. S. , Switzerland and Thailand collaborating in its efforts, to ' internationalise' the CIO concept by opening chapters and setting up corresponding secretariats in U. S. , Switzerland, Thailand and Japan. Inaugurated on January 19, 2006, the objectives of the Academy are " to make a study of various issues and pursue the universality of knowledge to

advance applied theory in the field of CIO. ” [25]. Table 5 The CIO Council: Learning from the Experience of Selected Countries, States and Regions S. N. CountryNameLessons (Notable Contribution to the CIO Concept) 1United KingdomThe CIO Council 2005)To address common issues among the CIO with strong top level political support 2United States of AmericaThe (Federal) CIO Council (1996)Principal interagency forum for improving Federal Government information resources 3Small Agency CIO Council (SACC)Discussion forum for the President’s Management Agenda, best practices, computer security, and other issues of interest to the CIO community 4National Association of State Chief Information Officers (NASCIO)Fostering “ government excellence through quality business practices, information management, and technology policy. ” 5CIO Council, New York StateGuidance of work through “ A Strategic Framework: Sixteen Principles. ” 6New Mexico CIO CouncilAdvisory, coordination, and administrative responsibilities. 7AustraliaNew South Wales Government CIO Executive CouncilPromoting the role of CIOs in the public sector and elevating information and communications technology as an executive-level issue in government. 8A joint Thailand-Indonesia project co-sponsored by Japan, Philippines, Malaysia, Viet Nam and United States of AmericaDevelopment of Model Government CIO Councils

An ongoing project “ to design an adaptive model to establish Government CIO policy bodies in the forms of Government CIO Council. ” 9Japan, USA, Thailand and EuropeInternational Academy of CIO (IAC) (2006)” to make a study of various issues and pursue the universality of knowledge to advance applied theory in the field of CIO. ” 10USA, Canada and AustraliaCIO

Executive Council (2004-)A private sector initiative to set up a " professional organization for CIOs. " CIO Executive Council: A Private Initiative Mention may also be made of the CIO Executive Council, a professional organization of CIO's. It is an initiative of the publisher of private sector CIO magazine. It was first launched in the United States in April 2004.

It " enables members to act as trusted, unbiased resources to one another while strengthening their businesses, impacting legislative groups, and collectively advancing the agenda of the CIO profession. " It exists in the U. S. , Canada and Australia. Check [26] for details. The CIO Council: Learning from Selected International Experience Based upon the above description of CIO Councils in different countries, important lessons can be drawn from this international experience as summarized in Table 5. VI. SOCIO-ECONOMIC DETERMINANTS OF E-GOVERNMENT AND THE CIO: A HYPOTHESIS Socio-Economic Determinants of E-government and the CIO Socio-economic parameters of a country determine the status of ICT sector and E-government in general and the status of CIO in particular. But this is a two-way, reversible relationship.

That is, the status of CIO also determines the status of E-government which, in its turn, also determines the status of ICT sector which, in its turn, determines the status of the economy as shown below: Economy —-> National ICT Plan —-> ICT Sector——-> E-government ——> CIO CIO——> E-government——-> ICT Sector——> National ICT Plan—-> Economy VII. DEVELOPING A FRAMEWORK AND AN ACTION PLAN FOR IMPLEMENTING THE CIO CONCEPT: THE CIO FRAMEWORK For making proper use of the CIO Model, a framework and an action plan for implementing the CIO concept are

required to be developed. The CIO framework can be developed by: A) Developing mechanisms to support the CIO so that he can play his assigned role competently, (B) Drawing CIO Profile so that we are clear about his qualifications, experience, and other desired qualities and attributes, (C) Defining CIO's Role so that we are clear about what to expect from them and CIO's are clear as to what is expected from them, and, above all, (D) Undertaking a PEST/SWOT Analysis of CIO for developing appropriate strategy, and (E) Training the CIO, by undertaking training needs analysis (TNA), identifying needed knowledge (K), skills (S), attitudes and attributes (A) and other things (Os), developing a training plan, and then executing it repeatedly in a training cycle.

These then are five components (A, B, C, D and E) which are required for developing a framework for implementing the CIO concept. For proper understanding of the framework each of these five components is described below. A. Support to CIO: The Model Chief Information Officer (CIO) Council Composition of the CIO Council: The General Body of the CIO Council The general body of the CIO Council should consist of Permanent Secretary, Ministry of Telecommunication and Information Technology (or by whatever name called) as its Chair and the concerned Principal Assistant Secretary (PAS) as its Secretary with all the CIO's of Ministries and Departments as its members. The general body of the CIO Council should meet once a year. The Executive Committee of the CIO Council

To steer the CIO concept on day to day basis, there should be a Executive Committee of the CIO Council which should consist of Permanent Secretary, Ministry of Information Technology and Telecommunication as its Chair and

the concerned Principal Assistant Secretary (PAS) as its Secretary with up to 10 CIO's of Ministries and Departments, to be selected by the Permanent Secretary, as its members. The Executive Committee of the CIO Council should meet once in a quarter. CIO Council Affiliation to the International Academy of CIO, Japan The CIO Council can also secure affiliation to the International Academy of CIO, Japan or any other similar institution, to keep a track of latest developments at international level.

The International Academy of CIO is a global initiative of Japan with Secretariats already established in Europe and the United States. It is expected to be a unique clearing house for implementing the CIO concept in developed as well as developing countries. It has so far no affiliation with any African countries. Table 6 CIO Role and the Corresponding Core Content S. N. Role Content 1. LeadershipExpertise 2. E-business PlanDomain Knowledge 3. LiaisonStakeholders 4. ContractsICT Technologies 5. Policies and StandardsInformation Systems 6. WebsiteUpdating 7. ICT-related CommitteesChairing 8. Link OfficerKnowing Ministry/Department 9. Porte ParoleAuthorisation 10. E-gov ChampionEspousing E-government B.

The Chief Information Officer (CIO) Profile The CIO profile is required to find out who is he and what are his requirements for professional development like providing necessary training. This will be based on a survey covering parameters like his age, educational qualifications, professional experience, and training already undergone. C. The Role of the Chief Information Officer (CIO) Civil services in developing countries typically do not have a job chart. This has both positive as well as negative implications. On positive side, it

enables the governments to change the duties without going through the time-consuming procedural formalities for changing the job chart.

The practice also keeps the civil servants on alert that they should be prepared to assume new responsibilities, often without notice. On the negative side, neither the governments know as to what to expect from civil servants nor do the civil servants know as to what is expected from them as a result of which efficiency suffers. Taking an over-all view, it is preferable to have a job chart for the CIO so that the government knows as to what is expected from him and the CIO too knows as to what is expected from him. Role Prescribed in the ICT Manual for Civil Service For example, the ICT Manual for the Civil Service of Republic of Mauritius [27] clearly prescribes seven main responsibilities of CIO. Reactive and Proactive CIO Role and the Evolving CIO Role

Ideally, the role of the CIO should be a proactive and not a reactive role. The CIO should not react to a situation but anticipate it and tackle it before its occurrence. This is a challenge as it requires the CIO to be ready to adjust to a new situation, whether caused by personnel, organization or new technology. Also, the CIO role described here is not cast in stone. It is a flexible and an evolving role, the role changing from time to time depending upon the requirements placed on the CIO. CIO Role and the Corresponding Core Content and Their Components Based on the 10 main responsibilities identified for the CIO and corresponding 10 specific roles and 10 core contents of the roles are described in Table 6.

Each core content can be further broken down in key components, which taken together could be said to constitute the core content. These key components represent the requisite knowledge (K), skills (S), attitudes and attributes (A) and other things (Os) and thus can be addressed by training intervention. CIO's ten roles, their key components and sub-components, as identified here may be seen in Table 7. Table 7 CIO's Ten Roles, their Key Components and Sub-Components S. N. CIO RoleCore ContentKey ComponentsSub-Components 1LeadershipExpertise1. Initiative 2. Persistence 3. Relationships 4. Eagerness to Learn, 5. Self-Study 2E-business PlanDomain Knowledge1. Business Process 2. Elaborating E- business Plan and implementing it 3. Business Process Re-engineering LiaisonRelationship with Stakeholders1. Government 2. Non-Government1. Within Ministry 2. Outside Ministry 1. Citizens, 2. Non-Citizens and 3. Business 4ContractsInformation and Communication Technology1. Knowledge of Procedure 2. Knowledge of Vendors 3. E-procurement 4. E-tendering 5Policies and StandardsInformation Systems1. Information System Policies 2. Information System Standards 6WebsiteUpdating Website1. Information Collection 2. Information Filtering 3. Use Monitoring 7ICT-related CommitteesChairing1. Project Steering Committee 2. Web Development Committee 3. Technical Committees 4. Project Management 5. Monitoring and Evaluation (M&E) Link OfficerKnowledge of Ministry/Deptt. 1. Knowledge of Ministry/Department 9Porte ParolePublic Relations1. Newspapers, 2. Radio 3. Television, 4. Civil Society Organisations 5. Others 1. Citizens, 2. Non-Citizens and 3. Business 10E-government ChampionSpirit to Excel 1. Knowledge Management 2. Change Management 3. E-government Marketing 4. E-government Advocacy 1. User Needs Identification 2. Meeting Identified

User Needs D. PEST and SWOT Analyses of the CIO Concept: PEST Analysis PEST is an acronym for political, economic, social and technological. It is a business management tool which is used in forecasting markets for various products and services.

The tool focuses on external macro environment. As such it can be successfully used in Information and Communication Technology (ICT) sector or E-government. For example, a PEST analysis has been used in transport sector in Cornwall County Council in United Kingdom [28]. Similarly Ha [29] has used it for e-government in Singapore though he has used both, the PEST analysis and the SWOT analysis. A PEST analysis of e-government in a developing country can also be undertaken which can be useful to CIO's in appreciating the future trends and directions in e-government in his country. SWOT Analysis SWOT is an acronym for strengths, weaknesses, opportunities and threats.

Strengths and weaknesses are treated as internal to an organization while opportunities and threats are treated as external to it. According to Albert S. Humphrey, one of its founding fathers, " SWOT analysis came from the research conducted at Stanford Research Institute from 1960-1970. The background to SWOT stemmed from the need to find out why corporate planning failed. The research was funded by the fortune 500 companies to find out what could be done about this failure. " [30]. Today SWOT analysis, and some of its variants, has emerged as important management tools in decision-making to achieve predetermined project or organisational objective.

See, for example, use of SWOT analysis in developing a Master Plan for E-government in Poland at [31]. E. Training of CIO Training Cycle for CIO If a CIO has to discharge his role professionally and competently, he has to be professionally equipped with expertise in various components and sub-components of core contents of ten CIO roles as identified above. This can be accomplished by training by imparting requisite knowledge (K), skills (S), attitudes and attributes (A) and other things (Os) to the CIO's. Once it is decided to provide training to CIOs, training will also require certification so that the trained CIOs have a sense of professional achievement.

This training intervention is required to be properly designed, requisite curriculum developed, necessary resource persons identified, desired training planned, implemented, monitored and evaluated and appropriate institutional arrangements made for imparting the training. This is all the more necessary as training is still regarded as an expenditure and not as an investment in developing countries. VI. LESSONS FOR DEVELOPING COUNTRIES From the foregoing analysis and assessment of the CIO concept both in developed and developing countries, five useful lessons for the developing countries where the CIO concept is either proposed to be implemented or has already been implemented, can be drawn.

First, there must be a Chief Information Officer (CIO) in each Ministry/Department or a public sector organisation by whatever name called, for driving e-government. He should preferably be a generalist (non-IT domain specialist, called CIO version 2. 0 here) rather than an IT specialist (called CIO version 1. 0 here) as the former has got better chances of success in e-government than the latter. Secondly, the Chief Information

Officer (CIO) must be supported by a Chief Information Officer (CIO) Council which has a General Council, consisting of all CIO's as members and an Executive Committee, which has selected CIO's as members, to guide the day-to-day affairs for implementing the CIO concept. Such a council, which must meet regularly, could also have international affiliation.

Thirdly, an appropriate CIO framework based on (a) Socio-economic determinants of e-government and the CIO, (b) Oversight by Ministry of Communications and Information Technology (c) Supporting mechanism like CIO Council, (d) Drawing up of CIO profile, (e) CIO role, (f) PEST/SWOT analysis of CIO and (g) Training plan for CIO, is required to be developed. Fourthly, to implement the CIO concept in Ministries/Departments, a long term, say 10 years, CIO Action Plan is required to be prepared and implemented. The plan should be broken into (i) short term (0-2 years), medium term (3-5 years), and long term (6-10 years) plans clearly articulating different actions to be taken and the time frame during which actions are required to be taken.

Fifthly, e-government champions are required to be identified and developed, both at the ministerial level as well as at the bureaucratic level. Experience indicates that without e-government champions the rate of progress of e-government development will be slow. However, such e-government champions are required to be carefully nurtured. VII CONCLUDING REMARKS A global perspective the CIO reveals that North America led by the U. S. leads in implementing the CIO concept followed by South-East Asia and the Pacific led by Japan, which is actively promoting the

CIO concept. Recently Europe has also joined the U. S. -Japanese efforts in promoting the CIO concept, thus forming a U.

S. -Japan-Europe CIO axis. The CIO concept has, however, so far not found any favour with the policy-makers in South Asia the way it has in the U. S. and Japan. E-government has been in operation for more than a decade. However, the pace of its progress of in many developing countries continues to be tardy. E-government is also often being developed in fits and starts and getting stuck in specific projects which are successful one day and failures the other. To develop e-government systematically and ensure sustainability of e-government projects and programmes, creation of an entity responsible for driving e-government is considered essential.

The CIO concept is well conceived and pragmatic. The concept, for better and enduring results in e-government, however deserves active support at the ministerial (political) level as well as at senior bureaucratic (executive) levels. VIII ACKNOWLEDGEMENT This paper is based upon a part of the work done by the author as Chief Knowledge Officer, Ministry of Communications and Information Technology, Republic of Mauritius, Port Louis during 2005-06 under the aegis of the Commonwealth Secretariat, London for driving the CIO concept in Ministries/Departments of Republic of Mauritius and is made available here for advancement of the cause of e-government in developing countries.

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