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FINDINGS

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CHALLENGES ON ICT IMPLEMENTATION AND RECOMMENDATIONS

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ABSTRACT

Implementation of information and communication technology (ICT) services and systems in organizations generally pose a lot of challenges that, if not properly addressed, lead to heavy investment without the corresponding organizational efficiency gains. This paper highlights the common challenges based on the experience of the author in working with various organizations and as ICT project manager, Systems Administrator, and Network Administrator. Moreover best practice recommendations to addressing the challenges are also given.

KEYWORDS
ICT, Systems Administrator, Network Administrator.

1. INTRODUCTION

There is a solid understanding that ICT can play an accelerating role in bridging the digital divide between developed and developing countries. And it is obvious that Developing countries are grappling with the challenges of the digital divide, a divide that denies immediacy of access to information and the ability and means to exploit it for beneficial economic and social use, leading to human development. Not only this at the organizational level, it is widely accepted (though not fully appreciated) that the integration of ICT in organizational functions is necessary for increased efficiency, cost-effectiveness, and competitiveness. The biggest challenge at the moment is to develop an ICT infrastructure, knowledge and skills that provide opportunities for sustainable development.But the greater challenges are found distributed in all the organization, mainly the executives.

2. AN APPROPRIATE ICT FRAMEWORK AND SOLUTION

First of all I would like to discuss about"**An Appropriate ICT Framework and Solution**".
In this section I will propose a framework that enables a more effective and appropriate design and implementation of ICT. The framework is founded in the traditional Systems Development Life Cycle (SDLC) that is used in Information Systems development, but extends it with tools and approaches that will guide the ICT solution to appropriateness.

1. **Definition:** Determine the goals, scope and requirements, Information Policy of the ICT solution
2. **Design:** Resolution of technical issues, selection of architecture and standards
3. **Construction:** Implementation of the design, testing and documentation of the system.
4. **Installation:** Roll-out of the services offered by the systems to the end-users, training.
5. **Operation/maintenance:** problem solving, user support, and incremental improvement through monitoring an evaluation focusing on the use of the services by the end-users.

As mentioned above, Appropriate ICT encompasses two perspectives: the product and process. In the framework this is expressed in four aspects: Policy, Hardware, Software and Change Management. Hardware and software result in a product, an ICT artifact. Policy and Change management establishes the process for the design, development, implementation, operation and **USE** of the ICT artifact.

3. ICT IMPLEMENTATION CHALLENGES AND BEST PRACTICE APPROACHES TO DEALING WITH THEM

Having the above highlight about how ICT is implemented and used now let's proceed to the challenges and implementation procedures. We argue that the following are the major challenges that hinder or lead to failure in the integration of ICT in organizations in the developing countries. Best practice approaches given for addressing each of the challenges.

4.1. LACK OF AWARENESS AND MINDSET

This is by far the greatest barrier, and it is the first one that must be dealt with before an organization can start moving forward. There tends to be some vague knowledge about ICT, interpreted as simply an advanced technology that requires a lot of expertise, a lot of money, and very advanced skills. It is not appreciated as a means of creating efficiency and cost-effectiveness.
Lack of awareness is indicated by one common answer: "It is too expensive, we cannot afford it". This ranges from the failure to purchase a computer of less than $1,000 to an integrated information system for a small organization costing $30,000. The same organization will, without hesitation, buy a four-wheel off-roader at $50,000 plus for the chief executive.
Lack of awareness goes along with mindset: "As it was, it is now, and evermore will be ". This is used lightly, but it cannot be put better. People tend to be stuck to the old ways of doing things. It is not uncommon to find an office where there is the standard secretary with a computer, and the "boss" with an even better computer – this later largely for show. The boss still calls in the secretary for dictation. The secretary still brings a printed draft for hand correction before the

final copy for signature is printed out. The secretary prints out the emails and puts them in the in-tray. They are transferred to the pending tray and, after about three weeks, the boss gets to them and calls in the secretary to dictate a reply.

The middle level and junior employees are not empowered to take decisions, even if they now have access to all the information and indeed have the capacity take the decisions. The person at the top takes all decisions – all other employees are there to simply push paper with recommendations up the decision pyramid. A long line of people is always to be found at the office of the boss – after all that is where decisions are taken. The pending paper work takes even longer, because the boss is engaged with people all the time. It is a sign of importance and a demonstration of how busy one is to have long lines of people waiting and huge piles of files on the desk. This, unfortunately, does typify many organizations, especially government, in developing countries.

The awareness and mindset problem in organizations is a four generation challenge, each of which requires a somewhat different approach (the age ranges below have overlaps):

The chief executive officers, ranging from 50 – 60 years are the biggest and most critical challenge. They grew up with the old methods, and yet they determine the direction and budgets of organizations. They have excellent understanding of organizational culture and dynamics as well as direction. They have the conceptual ability to think far and deep, looking at the organization as a whole. This is where the initial emphasis needs to be put.

The senior executives, ranging from 40 – 50 years. These tend to be more ICT aware while possessing many or all of the abilities of the chief executives, but they are also generally conservative and also stuck in the old ways. They make the recommendations and generally control the power (taken as influence) in organizations. This group must be on board if organizational change is to occur. It is also in this group that the necessary champions of change in the organization will be found – those people who combine the senior executive organizational knowledge and influence with a pioneering spirit and passion. The champions must be comfortable in dealing with both the highest and the lowest levels in the organization.

The junior executives, ranging from 30 – 40 years. This is the dynamic group that, if brought on board, will ensure things are actually done. They understand the organization, have reasonable people skills, and link easily to the youngest generation. They are comparatively easy to bring on board.

The young employees, ranging from 20 – 30 years. These really know it all, and will have a lot of bright ideas. They unfortunately have neither authority nor power. They also lack full knowledge of organizational culture as well as people skills. They tend to be very short on conceptual skills – and unfortunately most organizations do not have entrenched programs for developing them. Any organization will benefit greatly by giving them ear and free reign in most technical aspects, and helping them to develop their conceptual and people skills, but they still tend to be largely back room.

A key to addressing awareness and mindset is full involvement in the process, and getting key decision makers to visit other institutions, preferably within the same economic belt, where change has occurred and where benefits can be seen. More importantly, the proposed integration of ICT services and systems in the organization must be seen to be responding to real needs within the organization, rather than simply following a fad. Formally organized awareness workshops with demonstrations also help a lot in addressing awareness and mindset problems.

4.2. LACK OF TOP-LEVEL COMMITMENT

Major organizational transformation, like that inevitable when ICT is integrated in organizational functions, requires the ongoing commitment and involvement of the Chief Executive and her team. It will not happen otherwise, and we draw from our experience with various organizations to make this a categorical statement: We have seen real change and progress where there has been top-level commitment, and lack of progress and moving in circles where there is none. A committed chief executive will be able to cut through the bureaucratic red tape that will inevitably be thrown up in the face of any major organizational change.

This incidentally extends to countries: unless and until the executive head of government is dedicated to the change, it will not happen, and resources will be uselessly dissipated.

Convincing a chief executive officer needs to be addressed through the demonstration of real need, and visits to other organization. No real progress in ICT integration will be achieved unless and until either the Chief Executive changes, or is changed.

4.3. DEFINING THE ROLE OF ICT AS ONE OF THE TOOLS RATHER THAN THE PANACEA FOR ORGANISATIONAL TRANSFORMATION

ICT is not about technology, but about organizational transformation. The organization,and especially ICT professionals, need to understand this. If one is going to put in a newset of furniture, one should also maybe put in new carpet, a touch of paint, and change the curtains. Some of the paintings might have to go or be relocated to give a wholesome living area. Integration of ICT in an organization is like major surgery on an individual: it must be preceded by a full medical examination and an understanding of the medical history. Other interventions are likely to be necessary before major surgery.

ICT creates an opportunity for change. All the challenges of the organization need to be identified, and those challenges that will be responsive to the use of ICT can then be so approached. Such use must go hand in hand with other measures that will ensure organizational transformation.

It is part of the creation of ownership to get stakeholder groups to think through the shortcomings of the organization, and recommend where ICT can be taken on board as part of a complete package of organizational transformation.

4.4. MAKING ICT RESPONSIVE TO THE ORGANIZATIONAL VISION AND MISSION

ICT must never set the direction of the organization. The direction is defined by theorganizationalvision, mission and strategic priorities. ICT is therefore only relevant in so far as it is responsive to these. It is an observed fact that in many organizations, even now, there is only some vague conception of what the organization is about, without a clear and stakeholder owned definition of vision, mission and strategic objectives. Where this is the case, these must be addressed first.

4.5. DEVELOPING A SYSTEMIC METHOD OF IMPLEMENTATION

Integration of ICT in an organization's functions is a complex process. It therefore needs to be fully conceptualized and defined before implementation to avoid dissipation of resources through implementation of unrelated or uncoordinated projects.

The starting point needs to be quantified. It is the start of a major journey for the organization, and clear stock needs to be taken of the entire organization and the local environment. What is the extent of physical infrastructure? How many people in the different departments? For a university: How many students? What is the projected growth? What are the ICT services, systems and infrastructure already in place? What are the general and expert ICT skill levels in the organization? To what extent can the local environment support the organization in its ICT plans? Such taking stock also provides a baseline against which progress can be assessed later.

The organizational ICT policy needs to be defined and agreed. This sets the direction, functions, and boundaries as well as targets of ICT in the organization. It provides a framework for the development and implementation of specific projects aimed at increasing efficiency and cost-effectiveness.

In developing the policy, the core business of the organization as well as the main customers of the organization must take center stage: in a competitive environment, this is the only approach that will ensure that ICT services and systems give the organization a competitive edge. The support functions are then considered, including decisions about when these might be better outsourced.

In a university, for example, the core business processes are learning and research. Finance and human resource management are support functions. The main customer is the student. All policy developed must therefore be taken through the litmus test question: "Is it responsive to student interests as well as the learning and research functions of the university?" The same question is used in setting priorities in the implementation master plan.

Major ICT projects are very demanding on organizational resources, both human and financial. Added to the need to bring people on board, phased implementation is normally inevitable. The implementation master plan details the related sub-projects that must be implemented to deliver the contribution

of ICT to the achievement of the organizational vision and mission. It prioritizes and gives the costs the projects as well as the human resource requirements and the timeline.

A well-defined and owned ICT policy and master plan is a pre-requisite to successful mobilization of funds, both internally and externally, for implementation.

4.6. CREATING OWNERSHIP

Successful implementation of ICT services and systems involves literally all employees and customers of the organization. It is therefore critical that they own the policy and the plan, otherwise organizational inertia and deliberate obstruction will lead to failure.

The process of ICT policy planning is therefore as important as the output. Organization-wide consultations are time consuming, but they are a must if success is to be achieved. Stakeholders must be involved in the identification of the organizational challenges, and in proposing areas where ICT will be useful. They must contribute to and own the policy. They must agree on the projects to be implemented, including their role therein.

ICT creates fear, especially the fear of job loss. The policy and master plan must therefore reassure employees by catering for training and retraining and opening up new opportunities for them. They must be able to see computers as tools rather than as competitors for their jobs. They need to recognize that they are part of the information systems.

Creating ownership calls for a process of iteration in developing the policy: it needs to be referred to the same forum up to the final version for full acceptability.

A key issue in policy development and creating ownership is that this process must not be left to the ICT experts: they only give guidance, and are the mechanics and drivers who make sure the engine is working properly. The driver or the mechanic cannot tell the owner of the vehicle where it should go. This also becomes a challenge to the ICT professionals who may be hired to work as consultants for the process: they must have the fine judgment to know when to give guidance without taking over the process. The main role of the consultant is empowering the owners to think for the organization.

A related challenge is getting stakeholders in an organization to think for the organization, rather than the natural tendency of considering the interests of their particular departments: This is taking "the forty thousand foot view" of the organization. If this is not achieved, the policy planning process will generate controversy instead of a coordinated vision.

4.7. SUSTAINABILITY

Many organizations in developing countries tend to have the "head in the sand" approach to the challenge of sustainability. It is recognized as an issue, but there is some inherent assumption of faith that someone else will worry about the costs. It is important that the policy addresses the specifics of how sufficient funding will be raised to sustain services and systems.

The key recurrent cost elements that should be considered include: Cost of bandwidth (very high especially in Africa). Cost of maintenance of equipment and applications. Recurrent cost of software licenses (applications for the main information systems, specialized applications, database platforms, and desktop applications). Cost of replacement of equipment: a computer bought today must be replaced in three to five years time. Emoluments for ICT professionals – generally at levels that are likely to be higher than average because of competition for the same human resource by the private sector.

Issues of sustainability will impact on other decisions, like whether or not to use freeware and to develop internal capacity for software development (the policy on make or buy). It also impacts on the decisions of whether or not to outsource information resource management services.

A good guiding principle is that while development partners can be asked to support the initial capital costs, they should never be asked to support recurrent costs, unless it is in the very short term.

4.8. INFORMATION RESOURCE MANAGEMENT

Information resource management (IRM) is a relatively new professional area in ICT. Itfocuses on assuring availability and reliability of ICT services and systems while containing the overall costs that would otherwise escalate out of control. Technologically developed countries face this challenge, and it is even more critical in developing countries. ICT professionals are currently on high demand and are very mobile: consideration must be given to the minimum required staffing skills mixes and numbers.

Means of motivation (not the salary) must be well thought out. The age profile is also important – the younger generation (twenties to early thirties) will generally do a better job on the hard side of information resource management. Where the organization is an academic institution, full use should be made of students who are able, and also enjoy, running many of the services and at a very reasonable cost.

In developing countries where computer skills and awareness are limited, the IRM staff needs to develop people, public relations, and conceptual skills to a higher level than in developed countries. The IRM leaders need to combine the normal IRM leadership skills with a high level of organizational knowledge, conceptual ability, and a pioneering spirit.

4.9. APPRECIATING CRITICAL STAGES IN INFORMATION SYSTEMS IMPLEMENTATION

Information systems (IS) that sit on top of the infrastructure are the platform for creating organizational efficiency gains from ICT investment in the organizations. They also pose the biggest challenge and are the most likely area of failure. Many of the hurdles in IS implementation arise from the fact that people are the most critical part thereof. What people in the organization think must be taken on board: in implementing information systems, perception is often more important than reality.

The following two stages are critical for the successful implementation of IS, but they are unfortunately often mishandled.

4.9.1. MAKING REQUIREMENTS STATEMENTS

Requirements statements stipulate what the information systems should be able to do. They eventually lead to the Request for Proposals document.

The first challenge here is that many organizations think that these should be developed by professionals (consultants) to get the job done quickly. Many IS consultants unfortunately also support this approach. This is a recipe for IS failure. It is very important for ownership and success that it is the people who work in the organization who should be guided in generating the requirements statements. This leads to the second challenge: in generating requirements statements, people tend to state what they do as opposed to what should be done. A learning cycle is necessary and must be allowed for in the implementation timeline.

A related challenge arises from the fact that most organizations have over time grouped departments for administrative convenience, rather than around functions. People will insist on all departmental functions as functional requirements for the application.

4.9.2. SYSTEMS ANALYSIS AND BUSINESS PROCESS REDESIGN

This is probably the most challenging area. It requires a mindset change to accept new ways of achieving the same output from the same input, to accept the collapsing of the decision making pyramid. The redesign process and collapsing the decision making pyramid necessarily leaves out some tasks and offices: it is a threat to job security. It is easy to end up designing processes around people rather than staffing processes with people. The inevitable outcome is that in an organization that has been structurally static for a long time, systems analysis and business process redesign must necessarily lead to organizational restructuring – anathema to most workers.

Systems analysis and business process redesign must however be carried out regardless: Computerization of poor methods of work will only lead to faster failure of the organization. It is however important that a parallel process of creating new opportunities for workers through training and retraining must be part of the overall plan so that the process does not lead to poor output or destroy ownership.

4.10. DEVELOPING THE ORGANIZATIONAL INFORMATION POLICY

The organizational information policy is at a higher level than the ICT policy. It is good to consider it as a pre-requisite or at the worst a co-requisite, of organization wide implementation of ICT services and systems.

The bringing of corporate data and information on line will bring on line a whole range of new access points, with no defined rights and obligations. In a university, students, for example, will have access to their academic record at all times, as will staff to their personal files. The procedures, rights, obligations, exclusions, and sanctions of such access all need to be defined.

One of the key aspects of the ubiquitous availability of information is the assurance of its integrity, and prevention of abuse of access. This requires that the organization clearly defines the rights, privileges, obligations and sanctions that relate to the high levels of:

- ❖ Access
- ❖ Privacy
- ❖ Intellectual property

It is also necessary to define at a lower level the policies and procedures that relate to: Policy management

Ownership of different categories of data and information

- ✓ Processes and procedures
- ✓ Assurance
- ✓ Records and Archives

Without an organizational information policy, the lower level requirements of security and assurance of integrity will be ad hoc, inconsistent, and prone to failure.

5. CONCLUSION

This paper has discussed, through a down to earth and practical approach, what the author consider the key challenges of integrating ICT in organizations in the scenario of most developing countries.

While funding constraints are acknowledged, it is the conviction of the author that in the current international environment, a good plan will get the necessary support, provided there is clear provision for internal funding to support recurrent costs and therefore sustain the initiative.

The best practices given should not be interpreted as prescriptive: The best approach in each case must be tailored by the staff of the organization (not external consultants) to the prevailing conditions and culture of the organization. This is the challenge we leave to organizations of all kinds in developing countries: *Develop your own capacity*.

I consider that ICT facilities can be viewed on the following level hierarchy: ICT infrastructure, basic software, and dedicated information systems. And I always feel pity seeing organizations only at the second level of basic software(not even using that effectively), and talk and think that they have satisfactory ICT systems, only to find that they don't even have proper understanding of appropriate ICT solutions and dedicated information systems.

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