All things 'e': understanding the real challenges in an accelerating world.

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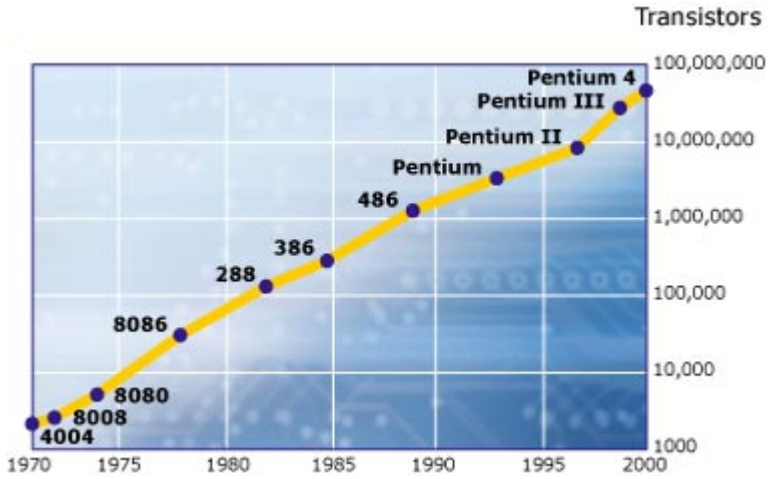
SUMMARY

The idea of a spectacular acceleration in the power of ICT and therefore a similar acceleration in those activities using ICT is a myth. Real progress depends on aspects of ICT other than hardware and particularly on how people use ICT and reorganise themselves as it changes the nature of the organisations within which they work and live. In governance and in education there are signs of radical changes under the influence of ICT to more open and flexible structures and power relations. There are signs also of resistance to change. Key components of the emerging situations have been identified as smart mobs and communities of practice. These emerging aspects of governance and education are what need to be understood and managed in order to realise the benefits of ICT. However, there are difficulties in understanding what and how to control and manage. We can be reasonably sure only of managing processes and mechanisms. Paradoxically, we already have the concepts and tools to approach these problems in what we already know of organisational management and of organisational architectures and processes. The idea of quality of service is a keynote for both governance and education and holds the prospect of being able to meet the needs of emerging groups as well as of the establishment in a rapidly changing world.

1. THE MYTH AND REALITY OF ACCELERATION

In this paper I want to take a broad look at the whole area of the impact of ICT. And I want to cover the territory between governance, knowledge management and learning as one and talk much more widely than the field of surveying. My position is that I am sceptical of hyperbole, both positive and negative, and note that in this territory there has been more than enough. I believe that we are already equipped to deal with envisioning, planning and managing the future and I want to begin to indicate what this entails, i.e. to remind ourselves of what we already know. This doesn't mean that I do not believe that there will not be rapid, even accelerating, change. There will, but just as sure as accelerating change are slowdowns, episodic changes and counter changes. It's normal, and we have been dealing with them in different ways for a long time.

Our visions of the near future have been fuelled by a remarkable and well known phenomenon, Moore's Law in its various forms. One such is shown in the graph below of the exponential relation between the number of transistors per chip and time.



Such relations have led many to speculate that the rapid exponential could soon mean having 100 GHz personal computers in every home and 20 GHz devices in every pocket and that cheap computing power will soon exceed any conceivable need. There are areas where this may not be true because the computing complexity of problems increases faster that available cheap computing power but it is nevertheless a fair generalisation.

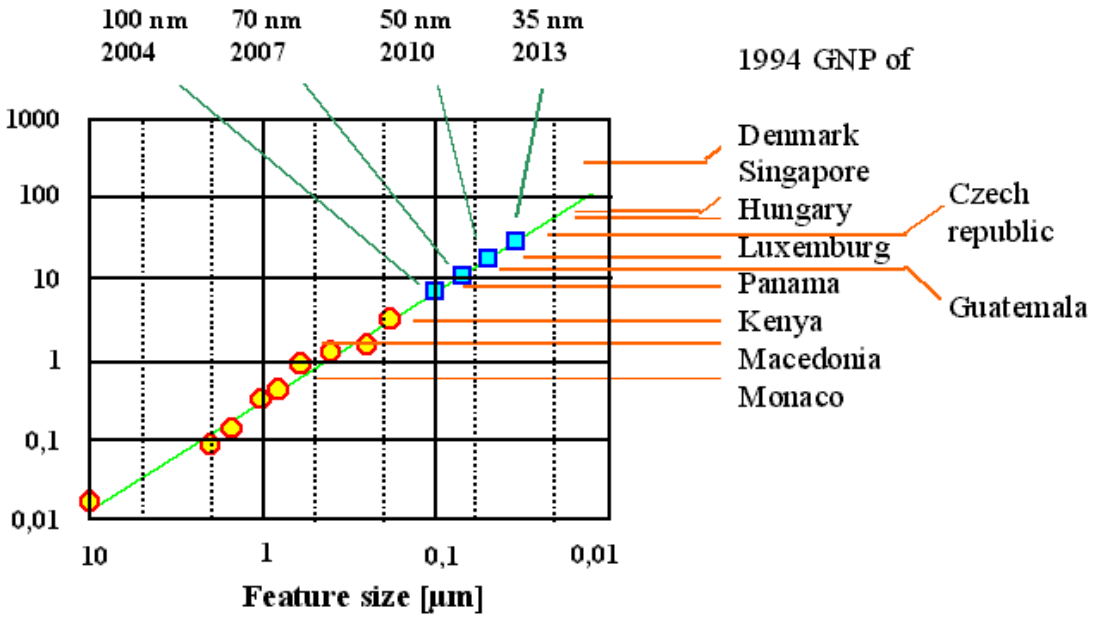
On the other hand, Gordon Moore himself has stated that the law may not hold valid for too long, since transistors may reach the limits of miniaturization at atomic levels. Although the law was made as a casual observation and only subsequently became a prediction, the more widely it became accepted, the more it served as a goal for the computing industry. It drove manufacturers to increase processing power in a fiercely competitive market. It became, in other words, a self-fulfilling prophecy with no status other than folklore or myth.

Now the point of all this is that these remarkable changes have fuelled speculation about the nature of ever sort of business on the planet. What is interesting however, as many commentators have pointed out, is that most ‘visionaries’ see no further than the obvious impacts of new technology. That is doing the same thing more or faster of cheaper. What we need to considers how new opportunities change the nature of what we do.

To begin to do this we must realise that the impact of such real changes must be judged in terms of system performance not computing power alone and that depends in part on software and on people. We will come to the people aspects later. Exponential improvements in hardware are not matched by exponential improvements in software. The performance of software products has not increase exponentially but by most measures has increased only slowly and fitfully over the decades. Software from major manufacturers has tended to get larger and more complicated over time and consequently slower. Another so called law, Wirth's law, and just as empirically based as Moore’s, even states that "Software gets slower faster than hardware gets faster". The net result is that system performance shows nowhere near exponential improvement. As many old-timers have been known to remark – ‘how long is it taking your system to boot up now?’. Some cynics also believe in a conspiracy between hardware and software manufacturers aimed at ensuring that performance never quite meets expectation and thereby ensuring continued demand for both their products.

And there are economic limitations that are likely to be realised in the next decade. Consider the graph of cost of developing successive generations of chips against time that shows also the predicted continued growth in costs and the GDP of selected countries.

Cost of development is, unsurprisingly, rising exponentially and is beginning to exceed the GDP of some countries, not that these countries are in the race to produce new chips. The real economic problem will be to recover these costs at roughly the same prize per chip. This means that an accelerating number of chips will have to be sold all the time in order to make development and production economic. It is easy to predict that in about 5 years time the market will need to grow at 100% per annum!



Clearly, this is not sustainable.

Such scenarios give ample scope to the fertile imaginations of so-called visionaries who find they can get an audience and maybe a fee for working out the implications of these startling rises in computing power or the implications of the equally startling prospects for collapse. We are, consequently, in a world of exponential rises in feasibility studies and scenario analyses.

We have on the one hand visions of totally connected worlds in which computing power is not a limit on any form of activity and we all have full-on services, customised, personalised, just in time, just for me me me. We have on the other hand visions of economic collapse, of utter uncertainty or of dysfunctional development where hardware and software systems evolve separately and the computing world is totally out of step with the users of computers.

But of course, whether or not reality is different both now and in the future, none of these types of analysis tell us either how things really are going to happen nor do they indicate what we can do about the situations that will face us. They are merely aspects (possible aspects) of the context of information technologies.

In order to understand real change we need deeper models of what is happening and models that point to actions and to solutions to possible problems. We have come to realise now that many things have to be in place to bring about real, lasting and widespread change and benefit from technology. People and organisations are just as important in understanding and actualising change and development as is technology, both hard and soft.

Part of that reality is understanding that the real and supposed changes cannot be in any respect whatsoever uniform, constant or progressive. One of the most striking features of IT seems to be its penetration to all walks of life and to all sectors and globally and yet its impact is far from uniform and the ways in which it is different in different sectors and in different pars of the world are far from understood. We can consider briefly the comparative levels of penetration world wide. This is not a side issue for scenario analysis since much of the future gazing is predicated on assumptions about the uniformity of global impacts of IT.

A UN report for 2001 (UN-DPEPA, 2001) shows wide disparity in capacity for e-governance and wider disparities in basic indices of PC ownership. Using an index of e-government capacity (based on various metrics of IT use, development and demographics for a country) we can rank countries according to their propensity to sustain e-government. Rankings are fairly predictable with the USA at the top with richer nations in the top rankings and so on down the economic pecking order. There is interest in the table from countries with anomalously low or high positions relative to what we might expect economically but overall the message is simple and clear.

The real message is however, that overall there is an assumed imperative to engage with technology in all possible ways. The benefits of open, democratic political processes, of open access to information relating to government, economy, social metrics and so on are assumed and assumed in a way that fits the western model of society (at its best). There is also an assumed imperative to adopt CandIT as quickly as possible.

The point to make here however, is not about economic or political imperialism, which is too easy, simple and probably too inaccurate a response. The point is that, like the scenario analyses, the terms of reference are too narrow to make any real sense either for understanding or for working out what actually to do about any of the situations to which the report alludes.

The same applies to analyses that are meant to apply to what are called the more advanced western societies, those with advanced CIT infrastructures and those with viable government policies for deriving benefits in measured ways. Prognostications and analyses based on technology and economics are not enough.

We need to look at the ‘peopleware’. And for the sake of a necessary simplicity we will assume the western model. In this context we will focus on two aspects of ‘peopleware’, the

politico-cultural and the infrastructure. We will be making the point in passing that infrastructure is not regarded solely as technology but also as service and as such is an aspect of 'peopleware'.

2. THE COMPONENTS OF GOVERNANCE AND OF e-LEARNING

In western cultures the emergence of e-governance has led to more intense interdependence between government and governed and between government and various organisations. It has led also to an underlying questioning of sovereignty and of the role of the state and to lower levels of government. In the most advanced technological and political countries the issue of governance and the management of benefits from technologies has therefore come to be centred around the relation between government and the individual and/or the community. In education the adoption of different forms of e-learning has led to radical shift in the power politics of education not only in terms of providers but also particularly at the level of the teacher-student relation. The old hierarchical structure has broken down as globally we see shifts along a spectrum from didactic education to communities of learning.

What is of particular interest and importance here is how people and groups of various sorts have responded in organised and unorganised ways to these changes in both sectors. In the field of governance, a number of studies and initiatives have consequently focussed on the idea of 'smart communities' as a key manifestation of the changes that are taking place in the emerging order of things. In education the parallel development is about communities of practice epitomised by the work of Etienne Wenger (1998, 2002) who coined the term 'communities of practice' and who has initiated the community project on 'Learning for a small planet' that aims to develop new models for learning based on the new context and dynamics of the technically enabled world. We will focus on these ideas as representing the mainstream of thinking. 'Smart Communities' are local self organising groups or ah hoc alliances which represent social, economic and political transformations in society and its fundamental relations. They include the idea of multi-level, multi-purpose, connected, informed and democratic dynamic organised structures in society (Coe et al., 2001). Communities of practice (Wenger, 1998) are groups of practitioners involved in a common activity as an informal network, with a common sense of purpose and a desire to share work related knowledge. They are not defined by any organisational mandate but only loosely by the ways people work together. They can experience a flux of members and exist for indeterminate periods. They exist for the members to learn through a process of social participation.

It is clear that these two ideas have much in common and we can refer to them both as smart communities or as Paquet calls them, smart mobs, a term I like since it conveys nicely the sense of disorganisation but of collective impact.

Now, the significance of this and the reason to focus on these communities here is that it is exactly this sort of complex issue that is the material reality that we have to deal with successfully if we are to understand, envision, plan and manage e-government.

A note of caution is needed here. Dealing with the idea of smart communities should not be taken to mean any of three things:

- that I think they are the only or best model of how semi-organised and un-organised groups work
- that there aren't other aspects of governance that merit equal attention
- that I agree in any way with the political agendas, sometimes reactionary, subversive and or radical, that are behind much of the literature. I have nothing against subversion or radicalism as such but it is not my purpose here to promote such ideas.

So, the reason to look at 'smart communities' is that the idea and the analysis provide a good handle on a set of ideas and issues that are at the core of e-governance.

The literature on e-governance recognises four aspects of governance that seem to be common to most of the more 'developed' countries and are being promoted with different degrees of awareness and vigour. These are:

- policy and political leadership
- enhanced access to information
- representation strategies at different levels of government
- on-line consultation and community building.

In so far as governments have developed e-learning agendas and strategies these aspects have direct parallels.

The idea that in fact these aspects have been realised in any substantial or mature way remains, in general, a dream. There are blockages and several have been recognised (Coe et al. 2001):

- the remaining need for new social technologies, that is technologies that support social processes and structures
- stronger approaches to education, awareness and leadership
- understanding of omnipresent dangers of centralised mindset
- the dominance of an administrative culture.

Coe et al. (2001) postulate three types of scenario that could emerge in response to the promotion of e-government and all of which are evidenced by recent e-government initiatives in Canada and in the UK:

- resistance to change
- status quo or incrementalism
- radical adaptation for a digital world.

Canadian and UK experiences it seems are between the first and second scenarios. In brief, there is limited progress in spite of government imperatives and initiatives and there are common and identifiable reasons (blockages) for this.

We need to understand why this is so and how to avoid the risks if we are to avoid blundering on in to an uncertain and expensive future that is beset with tensions and frustrations in public life. A hard hitting examination of the issues is found in Paquet (2003) in a paper entitled 'There is more to governance than public candelabra; an analysis of Canada's public service'.

Paquet makes his position clear from the outset, and it is one that by and large I share and see applying also to e-learning;

> "Indeed, for many techno-optimists, **e-governance** (hazily defined) has become a label used to connote good governance in an electronic environment, and has been holding the promise of unbounded progress in all realms of governance including government. I do not share this reductive and utopian view: an ICT-enabled route does not suffice to achieve good governance. ICT makes possible new processes of coordination but the governance challenge cannot be met through the sole virtues of electronic information and communication
> devices. Indeed, ICTs, though making possible new information networks, have also weakened nation-states – their institutional order, their authority and legitimacy regimes. This has triggered a need for quite different governance arrangements – arrangements that recognize a reduced role for the state and call for a refurbished and transformed public service capable of playing novel roles of brokers and *animateurs*."

The analysis is based on the Canadian federal system but his key points and conclusions have much wider resonance. There are five 'reference points' for government that are or perhaps more accurately should, according to Paquet, being redefined.

1. government is becoming more trans-national
2. the role of the state is being eroded and it is coming to depend more and more on other stakeholders
3. ICT is changing the rules of engagement between government and stakeholders
4. citizens are becoming increasingly informed and vocal and proactive
5. trust and confidence in public officials is falling

All these points have parallels in e-learning except my casual observation is that the effects are slower to be realised.

These nascent processes are seen as transforming the context in which public services are offered and Paquet identifies three aspects to this context.

1. from hierarchical government to distributed governance.

> Paquet notes however, that "Distributed governance does not mean only a process of dispersion of power toward localized decision-making within each broad sector (private, public, civic): it entails a dispersion of power over a wide variety of actors and groups within and among sectors because of the fact that it has been established that the best learning experience in a context of rapid change can be effected through (1) decentralized and flexible teams (2) woven by moral contracts and reciprocalobligations (3) negotiated in the context of evolving partnerships (4) bent on generating novel responses.
>
> The new form of transversal coordination now in the making may not suffer as much as some fear from the loss of central control and the weakening of the national state

imperium. A different sort of *imperium*, adapted to the network age, is emergent: reminiscent of the Roman empire under Hadrian, where the institutional order was a loose web of agreements to ensure compatibility among open networks."

There are seeming parallels in education in communist of practice. However the emergence of new forms of governance in the form of communities of practice or of networks of various kinds has not diminished the existing structures and relations. There still remain strong hierarchies and indeed the development of new centrally organised groups to service e-learning in different sectors and to various life groupings.

2. from egalitarianism to subsidiarity

"The dual shift – from government to governance and from egalitarianism to subsidiarity – is in the process of subverting quite significantly….. socio-technical system(s). But such subversion has also led to a mammoth ideological backlash that has fed a wave of "dynamic conservatism". This dynamic conservatism has taken many forms: simple denial of these emergent phenomena, refusal to explore their implications and even, at times, aggressive rearguard strategies by welfare state ideologues…."

To date this has not happened in education, at least not in higher education. This is possibly because the power relations in education are different and weaker and higher education in particular does not yet feel threatened by change.

3. new forms of collective intelligence and social learning

"This dynamic conservatism (referred to above) explains why the third pattern of change – the new importance of non-state actors, networks, and self-organisation in collective intelligence, collective action and social learning – has been slow to coalesce. Especially since the Second World War, the state has played such a dominant role in defining collective action that (1) observers have not paid much attention to the less than perfect marksmanship of the state; (2) citizens have been unduly easy to persuade that only the state can provide the requisite security of supply of essential services; (3) the slow growth of alternative ways invented by communities as responses to what they felt were collective needs not attended to satisfactorily by the state has gone largely unnoticed and has remained somewhat "illegitimate…. New forms of collective intelligence and social learning have consequently emerged rather slowly and remain the target of attacks by phalanxes of undeterred "social democrats".

The parallels in education are striking and are encapsulated in the world of communist of practice.

3. CONTROL IN GOVERNANCE AND IN e-LEARNING

Now, it seems from this sort of analysis that we can identify the nature of e-governance and f education both as they are promoted and as they are emerging in more 'advanced' countries and societies. The main trends of change can be discerned and they are seen to be common, as can the fact that there are common barriers to change. Perhaps the most important aspect of this change is the shifting balance between central government and government at other levels and between stronger and weaker power that tends to come about with the emergence of local, diffuse and perhaps arbitrary groupings with or without clear political or social or educational agendas.

All this of course only goes towards addressing the first part of the problem raised earlier in this paper. That is how are we to understand better what is happening. The more challenging issue is how to plan and manage governance and education that include mobs, smart or otherwise.

This challenge of both in the electronic, connected world is that of creating and controlling the smart mob. This entails amongst other things:

- ensuring coherence of public sector interventions by members of the smart mob
- co-ordination between various public bodies, central and civic, and private bodies
- fostering collective intelligence (Paquet, 2003)

This challenge requires an understanding not only of the dynamics of mobs but also of the government and civic bodies. These latter are not simple, nor are they merely the instruments of politicians or even of civil servants or professional educationalists. They have their own dynamics and logic and their own relations to each other and to bodies formal and informal. They are complex, messy and unpredictable at best. Subversion, radical change and dogged resistance are not the exclusive preserves of any sector of society!

Here however is a puzzle. How to control the mobs both within and without government and education? Paquet presents three routes to control and I am taking them to apply to both governance and education. The first and second, that is transforming directly principles and structures of government(education) and transforming culture and ethos, he rejects as unworkable simply because we do not know enough about how such systems work in these terms. A third approach focuses on processes and mechanisms, and in fact he admits since we know little enough about many processes in public life we must fall back on understanding and controlling mechanisms as "the only real operational lever at hand". (Paquet, 2003)

The question is how to go from where we are now and focus on mechanisms and processes? We can't reinvent our total wealth of knowledge. We must go from what we understand already of organisational management and architectures and from this build our understanding in the context of the new situation.

Two sorts of frameworks are proposed as potentially useful (and certainly necessary) that could provide a focus for controlling mechanisms and processes.

One is based on analysis of organisation cultures and change. It is not explored here since there is already a wide literature, extensive use of the principles in the commercial environment and plenty of experience of management, although it has to be said there has been little work on the management of the 'smart mob'. Nonetheless, there seems little reason why the ideas of, say, Handy (1993, 1995), on organisation power cultures, on power and communication structures, on conflict and conflict resolution, on organisational design, on activity management and on the dynamics of organisations cannot with benefit be applied to the complex arena of governance.

The second framework for managing mechanisms and processes is based on a set of ideas around Service Oriented Architectures that come from modern ideas on organisational IT and business process. This is an approach to what some term organisational alignment, an essential condition for the realisation of the benefits of ICT in organisations. Initially worked out for commercial, unitary organisations, the principles apply generally and are put forward here as a likely fruitful approach for both sectors. They have potential in approaching the key problem of understanding and managing processes and mechanisms where smart mobs are involved in governance or education.

The set of ideas are of Service Oriented Architectures(SOA), Quality of Service Frameworks(QoS) and Knowledge Driven Processes(KDP). They are summarised below. This is taken from a report by Dexter and Petch(2003). In order to avoid the clumsy drawing of parallels between the commercial sector and the emerging situation in governance much is left to the reader to draw the clear parallels for themselves.

The commercial sector is experiencing radical and far reaching changes in thinking about how enterprises are run and how the challenges of technology-led business operations can be met. The emerging requirements point to an end-to-end view of business processes and to a service view of what an organisation offers. The question is what kind of organisational and technical architecture can support this view? The services provided by the organization need to stand up to a highly competitive and potentially massive market in which changing requirements and shifting business emphasis are the norm. If the organization wants to succeed in a global market it needs scalability, adaptability, agility and the establishment of a brand. To achieve these qualities the enterprise needs a certain approach, and informed thinking indicates a *service-oriented, component-based architecture*.

This scenario is almost exactly paralleled in the governance sector. There is a stark need to focus on user needs/requirements and this is the sole focus of a SOA approach. Fluidity is the hallmark of required IT systems for both situations and not only in the service or process but in accommodating the changing or differential need of users as well as the demands of users and service providers evolving in parallel both in their understanding of what governance means and in awareness of each others roles and needs.. The high level solutions are the same.

Delivering enterprise architecture and delivering governance systems is not about delivering IT strategies. Nor equally is it about delivering a business strategy or a fixed political agenda. The key is aligning strategies both at a high level and functionally. The enterprise,

like the system of governance, needs to arrive at service creation and delivery processes and systems that are both open and connected, in which there is no discontinuity between the business and IT. It should be building services from the business processes and then looking to IT with other organisational elements to provide the needed component parts. **The IT strategy should be aligned with the business/governance strategy neither bolted on to it nor driving it. A service-oriented, business requirements driven approach ensures greater alliance between IT and the business.**

Enterprise architecture comprises standards, policy and procedures, methodology, tools, and infrastructure. It addresses people, processes and technology. In the search for appropriate enterprise architecture all the above aspects must be taken into consideration.

There seems to be general consensus that in the near future, the heart of any organisations' capabilities will be a broad layer of services provided by both business and technical components, constructed within a variety of development environments, and operating in a collaborative manner that preserves the organisation's investments by incorporating componentisation of legacy functionality. In other words it builds on what it has and makes sure these systems work to deliver services. These components and services, including some provided by external entities, will be pulled together in a dynamic manner to support both traditional and e-business processes, and provide the required quality of service (QoS).

Moving to a new enterprise architecture is a process affecting organisational as well as technical aspects. The new roles, concepts and techniques may form a barrier to successful transition and **it is necessary to help people adopt and use the architecture by providing a framework of guidelines, best practices, templates and tools. These are actively integrated into the work processes rather than being merely reference documents. These are the knowledge based processes (KBS).**

Organisations have to learn to build ever more complex and flexible applications and products from a reservoir of reusable components. Reusable business components may include software or materials but are just as likely to be people-based artefacts such as elements of procedures, good practices, patterns and templates.

Current methods and technology cannot guarantee successful development of high-performance, flexible, distributed systems and much has to be un-learned prior to adopting the new concepts as well as learned from scratch.

The Framework, the QoS frame, is essentially a quality assurance tool that addresses the end-to-end business processes, their context, requirements and implementation and allows organisations not only to function well but to learn as they go along. In other words these are procedures that guide people in what to do in any situation or context. The *QoS Framework* should provide methodology, guidelines, wizards, utilities, templates and tools for any process in business or governance or education.

The Framework will allow management of the stages in the transition to the new architecture, aiding in operation of existing resources while moving towards the developing service oriented and component-based regime. **The Framework must provide a coherent**

set of mechanisms by which business requirements are modelled, their logic is turned into a flow of activities, which is then executed by a set of components, and their performance is monitored and evaluated.

At the core of this is a model driven approach to understanding, describing and formalising processes but this topic is much beyond the scope of this paper.

The Framework is a model of how the organisation wishes to run its business of providing services to its market and meeting stakeholder requirements. Thus, the Framework comprises all the required people, policies and processes, in addition to a repository of reusable components. The Framework manages the business processes, serves the business requirements and is made up of autonomous components that may contain executable software – the e-business, e-governance or e-learning elements.

4. FINAL WORDS

Much of what is being proposed may seem unexceptional or even staid. If so then, paradoxically, this is encouraging. The shift to SOA and QoS is no more, in the end, than a shift in the mind sets of managers and users and these approaches should not be seen as a sort of silver bullet or magic potion. They are of course much more than a mere shift in mind set in that they provide also a method for following through the consequences of that mind set in providing he basis for making real changes to real systems.

The main point of this paper is that we already have the equipment and conceptual know-how to deal with radical, rapid, uncertain, differential change. Especially we have the know-how to take an approach to envisioning, planning, designing and operating systems that involve disparate users with uncertain and changing needs as well as (at worst) wayward managers/politicians with diffuse or contrary agendas.

This is not to say that putting good systems of governance and education in place will be easy. It won't. That's not the point. There is no easy way to make such changes. The point is that we already know much of what the necessary changes will involve. The problem therefore is for those in power to set out a sensible and understandable agenda for change, to engage with those they govern(?) or with whom they engage in education and to put in place those structures and processes that will enable the changes. Its called good management.

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