Using the New Institutional Economics in e-Government to deliver transformational change

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Abstract: e-Government puts demands on government organisations which may require new management frameworks. This paper presents interim findings from a doctoral research study exploring how a framework based on the New Institutional Economics leads to greater understanding and new insights. This paper, which outlines the theory and shows how it has been applied as a practical business tool in an e-government context, updates the paper presented at the 2004 European Conference on e-Government.

Keywords: Institutional economics, e-Government, transformational change, ICT, education

1. Introduction

This paper reports progress of an empirical doctoral research study investigating how the body of theory known as the New Institutional Economics (NIE) can be applied to e-government. The research arose from an identified need for a theoretically sound, evidenced framework for analysing challenges that e-government presents in practice. Participatory action research, using diverse case situations, was adopted as the research paradigm.

An extensive theoretical and empirical literature exists on how the NIE has been used to understand and interpret areas of regulation, policy and procurement in both public and private sectors. Despite a recent reawakening of interest in the theory and its potential application to e-business, there is little evidence that this theory is being applied to e-government. The research seeks to understand why, and determine whether there are practical lessons to be learned.

This paper presents interim findings from the main case situation which is using information and communication technologies (ICT) to transform the economics of school age education.

The research is being carried out part time at Henley Management College by a practising information systems professional with direct experience of significant e-government projects.

2. Context

Through experience in significant e-government bids and contracts over recent years it became evident that many familiar management models fail to address key issues that arise in e-government practice such as differences between trading electronically in a “marketspace” and physically in a marketplace (Rayport and Sviokla, 1995).

Trading on-line 24x7 makes limitations of internal systems externally visible. Information systems down-time, whether planned or unplanned, reduces the level of service provided to customers. Integration of internal information systems and electronic links to other organisations in the supply chain becomes critically important. The nature of economic transactions and their associated transaction costs changes. Business relationships alter as a result of the rapidly changing nature and use of IT. These are concepts central to the NIE.

Drucker (1995) suggested that the firm as legal entity is economically insignificant in generating business value, that what matters is the overall economic process, not who owns what. He dismissed the governance arrangements that are required to ensure that contractual commitments are met, apparently assuming that there will never be disputes between legal entities within the overall economic process. In contrast, the potential for such disputes is assumed within the NIE.

3. The research

The research is investigating how to apply NIE to strategic e-government decisions about the use of IT in circumstances where IT has become critical to an organisation’s operations. Case situations

ISSN: 1479-439X

were selected where there was sound contemporary management practice and IT could enable significant change in business operations.

The research makes assumptions about organisational change and strategic alignment.

Organisational change in the context of e-government is evident in changing organisational relationships, changing supply chains, electronic markets, online and reverse auctions (Bakos, 1998), disintermediation, and changing firm boundaries. Nooteboom (2000) distinguishes two orders of change, parametric change and architectural change. Parametric change is expressed as incremental changes which do not require a change to the way of thinking. Architectural change is expressed as requiring a change to the mental model. This distinction has similarity with the learning theory concepts of single and double loop learning (Argyris and Schon, 1974). The research is limited to architectural change.

Burn (1993), investigating relationships between "organizational configurations" and alternative patterns of information systems (IS) development, focused on the IS strategic process and concluded that different stages of growth in the use and development of IS required different approaches to strategy, with different approaches favoured by different "organizational configurations". Burn noted progressive phases of strategy alignment (diagram 1).

Phases of business strategy formulation	**Phases of IS/IT strategy formulation**
Phase 1: Long term planning	Stage of growth
Phase 2: Business planning	Business systems planning
Phase 3: Portfolio approach	Portfolio analysis, critical success factors
Phase 4: Competitive analysis	Customer resource life-cycle, value added chain
Phase 5: Incrementalism	Contingency approaches
Phase 6: Contextual	Strategy as learning?

Diagram 1: Phases of strategy formulation (after Burn, 1993)

Strategic alignment assumes separate business and IS inputs into strategic planning. The integrative framework derived from the NIE in the research relates strategic decisions concurrently to business and IS/IT domains (diagram 2).

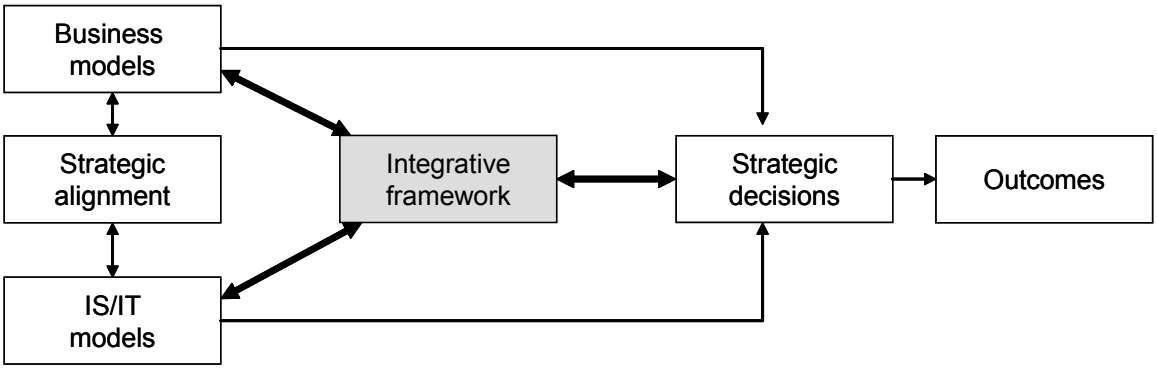

Diagram 2: Positioning of integrative framework

4. The New Institutional Economics (NIE)

The choice of governance structure, such as between market and firm, to conduct economic activity has been the subject of much research in management and industrial organisation (Kulkarni and Heriot, 1999). An organisation may secure inputs through market mechanisms such as spot-bid contracts (Williamson, 1975, 1991), or by producing items in house.

Williamson coined the phrase "the new institutional economics" (Coase, 1998). Coase (1937) had earlier identified that it is inappropriate to confine analysis of the economic behaviour of organisations to what happens within a single firm. The costs of coordination within a firm and the level of transaction costs that it faces are affected by its ability to purchase inputs

from other firms. The ability to supply these inputs depends in part on costs of coordination and the level of transaction costs. This is a complex and interrelated structure. Add the influence of laws, the social system and culture together with the effects of technological changes such as the digital revolution with its dramatic fall in information costs and one gets a complicated set of inter-relationships (Coase, 1998).

Central to institutional economics are the capacities of different structures to harmonise relations between different parties. Where others took the boundary of the firm as given and examined how well markets mediated exchange in intermediate and final goods markets, Coase (1937) held that the boundary of the firm was a decision variable for which an economic assessment was needed on whether to keep operations in house or to rely on the market. The NIE is concerned with such assessments.

The institutions of principal interest to the NIE are

- the institutional environment, in effect the rules of the game such as the polity, judiciary and laws of contract and property (North, 1991), and
- the institutions of governance, in effect the play of the game such as the use of markets, hybrids, firms or bureaus (Williamson, 1996).

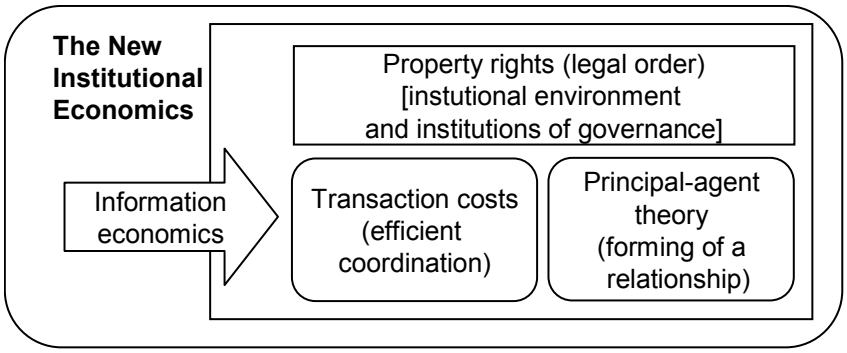

Diagram 3: Components of the New Institutional Economics (after Brockmann, 2001)

The NIE combines two theoretical approaches to economic organisation (diagram 3):

- transaction cost economics (TCE) approaches the study of economic organisations in terms of alternative governance structures for managing transactions including market, hierarchical and other hybrid governance forms, and
- agency theory (AT) addresses the agency problem caused by separation of ownership from execution, the principal-agent distinction.

4.1 Transaction cost economics

A transaction occurs when a good or service is transferred across a technologically separable interface (Williamson, 1981). One stage terminates and another begins, and with an interface that is working well transfers occur smoothly. Mechanical systems have friction, transaction costs are the equivalent of friction for economic systems. The critical dimensions for describing transactions are uncertainty, the frequency with which transactions recur, and the degree to which durable, transaction-specific investments are required to realise least cost supply (Williamson, 1979).

Downes and Mui (2000) suggest that reduction in transaction costs changes the value propositions within the digital value system, causing disintermediation. They describe six types of transaction cost:

- Search costs: buyers and sellers finding each other in a broad and disorganised open market
- Information costs: for buyers, learning about the products and services of sellers and the basis for their cost, profit margins and quality; for sellers, learning about the legitimacy, financial condition, and need of the buyer

- Bargaining costs: buyers and sellers setting the terms of a sale or contract for services, which might include legal and negotiating costs of contracts
- Decision costs: for buyers, evaluating the terms of the seller compared with other potential sellers; for sellers, evaluating whether to sell to one buyer instead of another buyer or not at all
- Policing costs: buyers and sellers taking steps to ensure that the goods and services and the terms under which the transaction was made are translated into real goods and services exchanged. This might include any negotiations having to do with inadequate delivery or payment
- Enforcement costs: buyers and sellers ensuring that unsatisfied terms are remedied.

Transaction costs are affected by the extent to which specialised investments have to be made to carry out those transactions. These specialised investments cannot be redeployed to alternative use without loss of productive value. The main dimension for such specialised investments is asset specificity.

Asset specificity is often ignored in analysing costs of economic behaviour. Where there is low specialisation users can turn readily to alternative sources of supply, and suppliers can sell output intended for one buyer to another buyer without difficulty. Asset specificity is relevant where software is highly specialised to particular purposes, for example large government IT contracts where significant department-specific understanding and IT systems knowledge has to be achieved and maintained by the contracted supplier.

4.2 Agency theory

Principal-agent thinking suggests that opportunism can be controlled internally by adequate monitoring through hierarchical structures. Foster (2000) contrasts this with a competence view. Shankman (1999), revisiting the foundations of agency theory, expressed concerns about its limitations. He showed how agency theory can be subsumed within a general stakeholder model of the firm, arguing that agency theory must include recognition of stakeholders. He refers to Eisenhardt (1989) for a description of the agency problem in the assumptions that the desires and goals of the principal and agent conflict, and that it is difficult or expensive for the principal to verify what the agent is doing.

The NIE's focus on principal-agent conflicts, information asymmetries, path dependency, problems of assigning property rights, and differential transaction costs, directly addresses real, existing institutional problems of fully developed and transistional market economies. It suggests ways of thinking about informal routines that imply that agents are not fully rational, independent actors, and approaches economic systems as open, evolving, path dependent systems that evolve in real historical time although it does not of itself explain how particular paths emerge or how real change comes about (Poirot, 2002).

4.3 Bounded rationality

The conventional view of the firm as production function typically assumes unbounded rationality (Kurdas, 1994). By contrast, bounded rationality implies that economic agents' decisions depend on the institutional setting. Conventions, policies and rules specific to the institution influence the outcomes and are therefore important for investigation. Through experience the organisation learns how to produce certain products, and how to organise itself to carry out tasks. However when conditions change, old routines and conventions can become dysfunctional, yet changing them is costly and uncertain. A central problem is how to achieve a balance between established patterns of behaviour and the need to make changes. Bounded rationality is of interest in e-government since knowledge about the potential of IT is often incomplete and subject to practical limitations of managerial time available to understand the implications of the technology. Bounded rationality must be distinguished from both hyperrationality and irrationality (Simon, 1978). In economic theory, "economic man" is often attributed with hyperrationality in terms of an ability to know and understand everything available. "Organisation man" has less powerful

abilities to use and analyse information. This limited competence does not imply irrationality. Boundedly rational agents remain "intendedly rational" even when they experience limits in formulating and solving complex problems and also in receiving, processing, storing, retrieving and transmitting information.

Kurdas (1994) explores choices of technology investment strategy in a context of bounded rationality, characterising two types of uncertainty – productive uncertainty relating to the internal operations of the organisation, and competitive uncertainty of the organisation's external environment – and suggests that investment strategies involve a trade-off between these uncertainties. A static technical strategy takes technology and preferences as given, minimising productive uncertainty, although it leaves the organisation vulnerable to changes in the market environment caused by other agents. In contrast an innovative strategy changes the technology and preferences, increasing productive uncertainty but if successful reduces competitive uncertainty by enhancing the organisation's market power.

5. Empirical studies and integrative framework

There are many empirical studies of the NIE broadly relevant to e-government. Shelanski and Klein (1999) review studies about vertical integration and complex contracting, price adjustment in long-term contracts, the effects of vertical integration on organisational performance, comparative studies of organisational forms, and organisation ownership and governance.

Rindfleisch and Heide (1997) concluded from reviewing 45 key empirical studies that "a discriminating theory of governance choice is still at an early stage of development" and questioned whether governance choice may be influenced more by imitation than by questions of efficiency.

Other studies are more descriptive. Maher (1997) examined the governance of contractual relations across different industries and highlighted the importance of trust. Beccerra and Gupta (1999) contrasted the NIE with the literature on trust using field data from a multinational corporation to illustrate that trust-embedded economic theories provide a richer explanation of intraorganisational relationship than trust-absent theories.

Clark et al (1995) investigated IS outsourcing as a strategic choice using a transaction costs approach producing a managerial and governance framework for the outsourcing decision from the results of in-depth interviews with executives. Hann and Weber (1996) modelled IS planning and the principal/agent relationship, testing their model using survey data; Huarng (1995) used agency theory to look at system development.

More recently, Stapleton et al (2001) applied NIE to the shift from marketplace to marketspace as defined by Rayport and Sviolka (1995), and Rasheed and Geiger (2001) explored determinants of governance structure for the electronic value chain.

6. Integrative framework

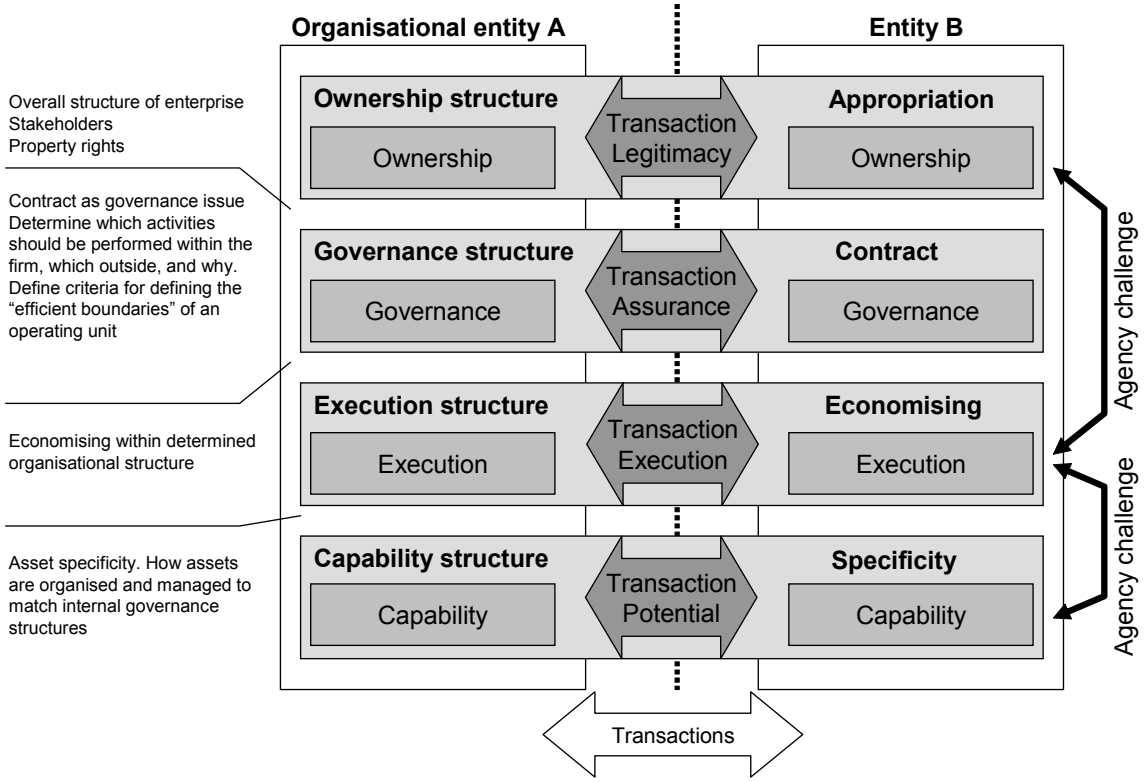

Diagram 4: Economics of transaction exchange

The model of transactional exchange developed through the research highlights transaction related costs to both parties (diagram 4). This echoes Madhok's (2002) view that the interdependence of production and exchange relations means strategic management is about coordination and resource allocation both within and across organisation boundaries.

Brockmann (2001), using the NIE with large construction industry projects, created a similar four layer model:

- Layer 4 – Property rights
- Layer 3 – Legal structure as laid down in man-made constitutions
- Layer 2 – Situational – cultures vary between countries, groups and organisations (the social inheritence learned by each individual from its reference group
- Layer 1 – the data for economic enterprises that cannot be changed, exhaustible resources for example cannot be augmented

The case example illustrates application of the theoretical framework to e-government related transformational change.

7. Research methodology

Previous empirical studies which considered the full breadth of the New Institutional Economics have tended to use a phenomenological approach. The current study follows this trend.

Reflective practice based on action research as an approach is well established for practitioners in other professional disciplines, including teaching and nursing, who assess theoretical models in the full complexity of professional practice. The approach used in the current study echoes Lewin's original conception of action research as a spectrum of activities through research, planning, theorising, learning and development giving a repeating cycle of research and learning in the researcher's long term relationship with a problem (Cunningham, 1993).

Action research has a focus on solving real-life problems. The focus of attention is determined by what the participants consider important, and what affects their daily lives, linking the enquiry process to solving practical problems and to actions taken to provide a solution to the problem

being examined. Theoretical enquiry can precede action as a way of acquiring necessary knowledge to design actions that will resolve the pertinent issue, as can reflections based on experiences drawn from prior actions that can be understood in new ways. Action research is generally used for more complex problems than the conventional social sciences because of its context-specific focus, its demands that theory and action are not separated, and its commitment to the idea that the test of any theory is its capacity to solve problems in real-life situations.

The notion that a conceptual framework and its implementation should be explicit in action research is not novel. Argyris and Schon (1991) argued that action research can be understood as intervention experiments within particular practice contexts in which action researchers test hypotheses pertaining to the resolution of particular problems and attempt to effect a desirable change in the setting based on their hypotheses. By this definition, interventions are an experimental manipulation with problem solving as the goal. The researchers' reporting of what was learned during an intervention in respect of the hypotheses should contribute both to improvement in practice through interventions that attempt to extend initial results to other settings, and to greater understanding about processes of planned social and organizational change (Bartunek, 1993). In the case study, interventions consisted of cycles of collaborative work on a new model for school age education in parallel with a series of pilot projects to challenge the new model and its potential to build beneficial use of information technology. These reflected core characteristics of action research (AR):

- AR is context bound and addresses real-life problems, in this case the challenge was to transform school age education across a Local Education Authority in response to economic imperatives.
- Participants and researchers cogenerate knowledge through collaborative communicative processes in which all participants' contributions are taken seriously. In this case the cogenerated knowledge was published as a joint and detailed white paper.
- The diversity of experience and capacities within the local group was an opportunity for the enrichment of the research-action process.
- The meanings constructed in the research process led to action, and reflections on these actions led to the construction of new meanings, as illustrated through the joint white paper.
- The credibility and validity of derived knowledge is measured according to whether actions that arise from it solve problems and increase participants control over their own situations, continuing action beyond the end of the research activity, as illustrated in the published case video.

The knowledge produced by the enquiry process increased participants' control over their own situation in that teachers and pupils are developing new ICT enabled models of school age education to suit their local situations, using the knowledge that emerged to support the achievement of pedagogic goals.

8. Case study: Transforming school age education

Kent County Council (KCC), a large UK Local Authority, is seeking to strengthen the Kent economy. The information economy and knowledge-intensive working are seen as economic mainstays for Kent's future. Higher skill levels and aspirations are an essential prerequisite to raising productivity and facilitating a shift towards higher value-added, higher wage economy.

Kent's Education Directorate is engaged in a radical programme of authority-wide structural change, enabled by ICT, to provide the highest possible quality of education throughout Kent and significantly improved standards of attainment for all. Improvement is being delivered through school clusters, a reworked economic model, and a "school that never sleeps".

The globalised information economy requires young people to be independent learners, confident in their knowledge of how to learn and ability to meet increasingly complex demands of life in a

constantly changing world. Every firm, and every community, competes with global leaders yet our 1 to 30 instructional model of education has changed little since the industrial age for which it was suited and typically teaches young people what to learn. The new information economy requires different skills with a new approach to learning so must be served by an education that prepares young people for their part in securing the future by developing new competences for the information age.

The conditions for transformation are present creating a challenge to realise the potential that a structurally different and ICT-rich model for education offers for a new future. Wireless, mobile, broadband and emerging ICT technologies have converged opening the door to whole new economic and learning communities. Technology such as mobile phones is everyday for pupils outside of school and no school age pupil has experienced a world without personal computers. There is a growing willingness amongst teachers to embrace technology as evidence grows of ways in which ICT can help enhance their professionalism and increase their effectiveness.

These changes affect the fundamental economics of providing learner-centred education. A project "Putting Learners First", developed alongside this research and involving a number of commercial organisations working collaboratively with KCC, is a first phase towards the deeply integrated use of ICT in delivering high quality 21st century education within and between Kent's schools (Ellis, 2004).

8.1 A reworked economic model for education

Providing 24x7 access to learning requires a "school that never sleeps". Using ICT, education can transcend the traditional boundaries of the school as an ICT-rich environment offers teachers and learners different ways of working. This can amplify the teacher's effectiveness and enhance their role as traditional teaching becomes part of a much richer blend of education resources and services. The role of the LEA is being redefined, with ICT being used to facilitate stronger relationships between schools. The intent is to make fundamental improvement to the quality and effectiveness of every pupil's education experience and standards of attainment.

The NIE highlights the dramatically changing cost profile of providing education, and the opportunity to provide significantly enhanced educational experiences.

In the research a pupil's learning journey through their school age education is characterised as a series of transactional interventions, both educational and non-educational, including lessons, assignments and other interventions to advance a pupil's education. This transactional model is reviewed and reassessed, challenging the current model as alternative forms of educational provision become available.

Conventionally the timing, nature and content of educational transactions has been controlled by the timetable and assigned teacher. Individual learner may only find out what is to be covered in a particular session at the beginning of the session, which precludes preparation. Already new categories of transaction are being created with, for example, the use of e-books and mobile working. The scope to carry out existing transactions in new ways to increase their educational value will partly depend on developing new classroom and school management models.

The changes are described in detail in a joint KCC and Microsoft white paper (Ellis, 2004) and supporting video.

8.2 Governance

The Education Directorate is changing its governance structures to bridge the divide between the Directorate and the schools. 22 school clusters (diagram 5) will bring closer cross-working and support between schools and with the LEA. This is changing the nature of the boundaries between schools to take advantage of greater connectedness through ICT so that schools and pupils can access resources beyond their own school's boundaries.

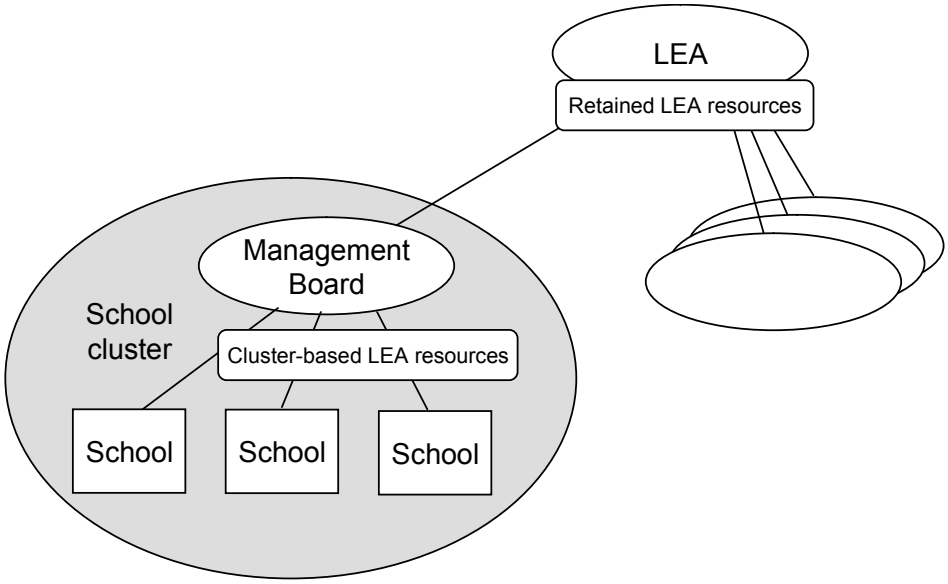

Diagram 5: School clusters

Scale economies from sharing resources and capabilities between schools is changing the viable range, size and physical structure of schools, and can give a realistic and sustainable cost of providing a full ICT infrastructure and supporting connectivity for pupils. However, comparing the cost of providing technology with the cost of other facilities and services is of little relevance unless outcomes are enhanced. KCC is contemplating a redistribution of funding which is likely to change the balance significantly between different categories of spend.

8.3 Execution

Effective delivery of outcomes against the education agenda depends on having the right assets and resources in place, aligned with current educational objectives, and managed effectively.

Clearly it is not sufficient to consider the school in isolation since it is part of a whole educational system which prepares teachers and educational materials, and makes them accessible to learners.

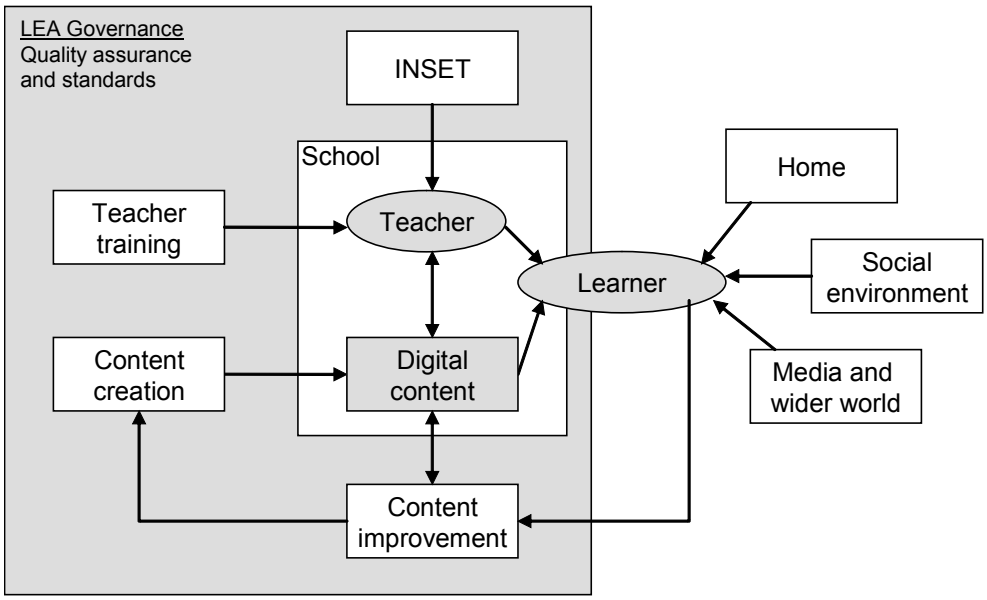

Diagram 6: Value system in education

In the industrial age this was a relatively slow moving system with some teachers being able to use materials repeatedly over many years. The dynamics of the information age mean that the conventional model is no longer appropriate for many areas of the curriculum. Management and improvement of learning materials becomes critically important, as does updating and upskilling of teachers.

The new model (diagram 6) complements the conventional model in that independent learners can, with guidance, determine what is to be learnt at each stage and select content to support their individual education plans. Teachers focus on activities which add value through their personal expertise and knowledge rather than those which can be achieved through technology. The individualised managed learning model is not unique or untested – the novelty is in the sheer richness and variety that can be made available to learners.

8.4 Capability

The new model requires different capabilities within the system as well as a robust ICT infrastructure. New forms of digital learning content are being developed, and existing learning materials are being digitised in formats which can be linked electronically to other content and materials. Shared responsibility for production of materials should reduce duplication, while maximising quality, consistency and coherence.

Teachers and other staff are already developing skills in creating and managing new forms of learning content, and in class and group management, and are building understanding of how best to use and apply the new opportunities.

9. Analysis and conclusions

Using the New Institutional Economics created insights that would not otherwise have been so readily appreciated. The structure of ownership and accountability within education is complex with schools retaining autonomy despite being monitored and funded through the LEA. Regulations, and controls on funding, have to be met as they govern what can be done and how, yet they do not necessarily keep up with new needs arising in respect of e-government. In the case situation, progress depended on being able to reconcile such conflicts which the model made more visible.

The pace of change in education is changing. The effect of the rapidly developing digital curriculum is to change the teacher's role away from being gatekeepers of knowledge and towards becoming mentors and guides on their pupils' learning journeys.

The diagram (diagram 7) summarises particular roles and responsibilities jointly identified as important in school age education.

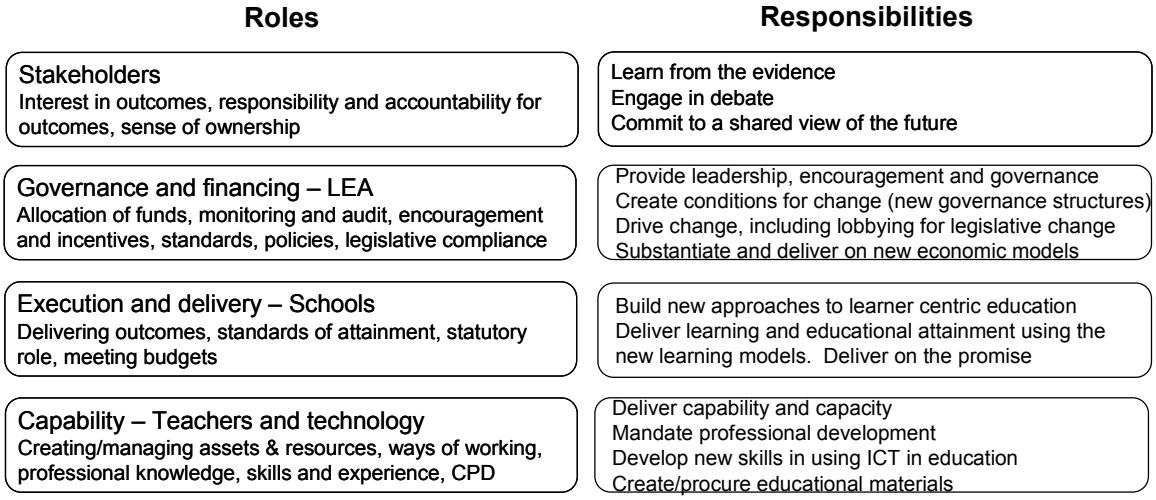

Diagram 7: Roles and responsibilities at each level

It is becoming clear that the NIE, although not trivial to apply, can be used as a conceptual framework for informing e-government decisions, that its use can help to expose new insights, and that it can provide a rich language for debating the issues.

A broader benefit from the case study was in recognising the value of having a model that reminds management professionals of a longer term, larger picture.

Finally, the main benefit so far has been to demonstrate how ICT really can change the economics of delivering education fit for the 21st century, a very practical application of the NIE to the economics of e-government.

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