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Centralised vs. Decentralised Management of Public Information Systems: *A Core-Periphery Solution*

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Centralised vs. Decentralised Management of Public Information Systems: *A Core-Periphery Solution*

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1999

Abstract

In dealing with information systems, public sector organisations have to cover eight main areas of responsibility: information systems planning, organisational structures and staffing, data management, computing and data management architecture, information systems development, information technology acquisition, training, and technical support. Adopting a centralised approach to these responsibilities can bring efficiency benefits, but requires some severe constraints to be overcome. Adopting a decentralised approach can help spread computing in the organisation, but is often wasteful. A 'core-periphery' approach to public information systems, combining both central and local action, is therefore recommended as being most effective. Details of such an approach are described within the paper.

[1] An amended version of this paper will appear in *Handbook of Public Information Systems*, D. Garson (ed.), Dekker: http://www.dekker.com/

A. INTRODUCTION

A1. Public Sector Information Systems Responsibilities

A range of potential information systems (IS) responsibilities arises in the public sector, from which eight can be identified:

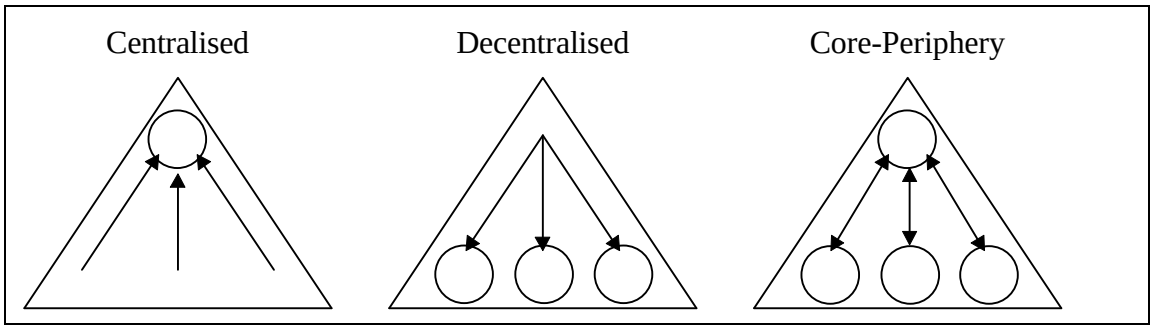
- *Information systems planning*: the priorities set for new information systems, for the applications of new information technology (IT), and for other IS-related changes.
- *Organisational structures and staffing*: the organisational structures used to support the information systems function, and the staffing of that IS function.
- *Data management*: the way in which data is structured and controlled in the organisation.
- *Computing and data management architecture*: the way in which IT is spread and connected throughout the organisation, and the way in which data structures and processing are divided across the IT.
- *Information systems development*: the who and how by which new information systems are analysed, designed, constructed and implemented.
- *IT acquisition*: what information technology is procured and how it is procured.
- *Training*: what skills are required in training, how that training is to be delivered, and to whom.
- *Technical support*: the way in which IT is installed, maintained, repaired and otherwise supported in its operation.

A2. Approaches to IS Responsibilities

There are three possible approaches to these IS responsibilities which will be discussed in this paper (see Figure 1):

- *Centralised*: decisions are taken at the most senior or central level.
- *Decentralised*: decisions are taken at some level lower than the most senior; typically by individual work units within the organisation or even by individual staff.
- *Core-periphery*: decisions are taken at *both* senior and lower levels, either separately or in an integrated manner.

Figure 1: Different Approaches to Information Systems Responsibilities



B. CENTRALISED AND DECENTRALISED APPROACHES: *Review Of Experience*

This section of the paper will now review the first two approaches described above: the centralised and the decentralised.

B1. The Centralised Approach to Public Sector IS Responsibilities

Many public sector organisations began their 'computing careers' by adopting a centralised approach, and there are continuing drives to maintain centralisation. These drives include particularly the desire of senior public managers to control the costs, pervasive impacts, and potential failures associated with information systems. Managers are also driven by the desire to achieve the potential benefits of centralised approach, including those listed below.

Sharing resources

A well-planned centralised system holds data used across the organisation in one place, allowing all staff to access it. This makes it both faster and easier to undertake organisation-wide activities. Central planning and operation also allows compatible technology and skills to be introduced. Exchange of hardware, software and staff between organisational systems and units therefore becomes much easier.

Avoidance of duplication

One main intention of centralised approaches is to have a single version of any particular information system for the whole organisation, and to store any item of data once and only once. As a result, there is no wasted effort, no wasted storage capacity, and no inconsistency of data.

Learning and control

A centralised approach to information systems provides an organisational focus for learning and for control. This is likely to produce higher quality information systems and can also reduce costs by:

- avoiding the decentralisation problems of non-functioning or malfunctioning systems,
- avoiding the decentralisation problems of inadequate security, maintenance and documentation, and by
- allowing technology purchases and system developments that are not organisational priorities to be blocked.

Achievement of scale economies

Centralised approaches allow most activities to be undertaken more cheaply per unit. Items purchased externally – computers, software packages, consumables, staff training, etc. – can be decided upon once and then bought in greater bulk. Activities undertaken internally – from system development to implementation and maintenance, and management of all these processes – cover a greater number of staff.

Constraints to centralised approaches

However, centralised approaches are beset by problems, some of which are outlined in this and the following section. First, there are constraints: most public sector organisations encounter considerable barriers if they attempt to develop a centralised approach to information systems, as described below.

Technical constraints

Where decentralised information systems, manual or computerised, are already in place, technical barriers to centralisation may be immense. Indeed, computerisation may create 'electronic concrete' that increases these barriers (Bellamy & Taylor 1994). The barriers include differences between existing decentralised IS in everything from data definitions to software to computing and network systems. Technical barriers also include the need to create some form of interconnection – typically a computer network – between the different organisational units whose systems are to be centrally controlled.

Resource constraints

Centralised approaches require the commitment of four key resources: money, time, people, and skills. For many public organisations, a centralised approach may not be possible because of financial constraints; because staff are too busy on other things; or because no-one has the confidence or capabilities to undertake the necessary planning and co-ordination tasks.

Perceptual constraints

The perception of information itself is a constraint to centralised approaches. Information is intangible, and public managers rely heavily on informal information in their decision making. Information is therefore perceived in a way that makes it hard for senior public managers to appreciate some of the key tenets of a centralised approach: that information is an organisation-wide resource; that it has a cost; that it can provide value for the public sector; that it needs to be managed; and so on (Heeks & Davies 1999).

Partly related to this is the perception of costs and benefits. The costs of decentralised approaches – of wasted efforts, of organisational inflexibility, of user time diverted from other activities – are frequently hidden. The benefits, such as managers being able to do what they like, are fairly obvious. For centralised approaches, by contrast, the equation is often the other way round. The resources required for the implementation of centralised approaches require an overt, 'up-front' commitment. The benefits, though, may be rather intangible, and it can be difficult to shift the perceived cost-benefit balance in favour of centralisation.

Political constraints

Information is a component of power. Any attempt to alter the pattern of information flows – which adoption of a centralised approach invariably involves – means a possible loss of power that will be resisted (Kraemer 1979).

This is a particular problem for the public sector given the political antagonisms caused by the need to fight over limited resources. Resistance manifests itself most often in an unwillingness to share data with other individuals or groups. Differing political agendas that create barriers to data sharing also exist. People find it hard to think of

"my data" or "our data" becoming "the organisation's data" (Buchanan-Smith et al. 1994).

Political barriers to the centralised allocation of other information system resources such as money, equipment and staff, can also arise.

Cultural constraints

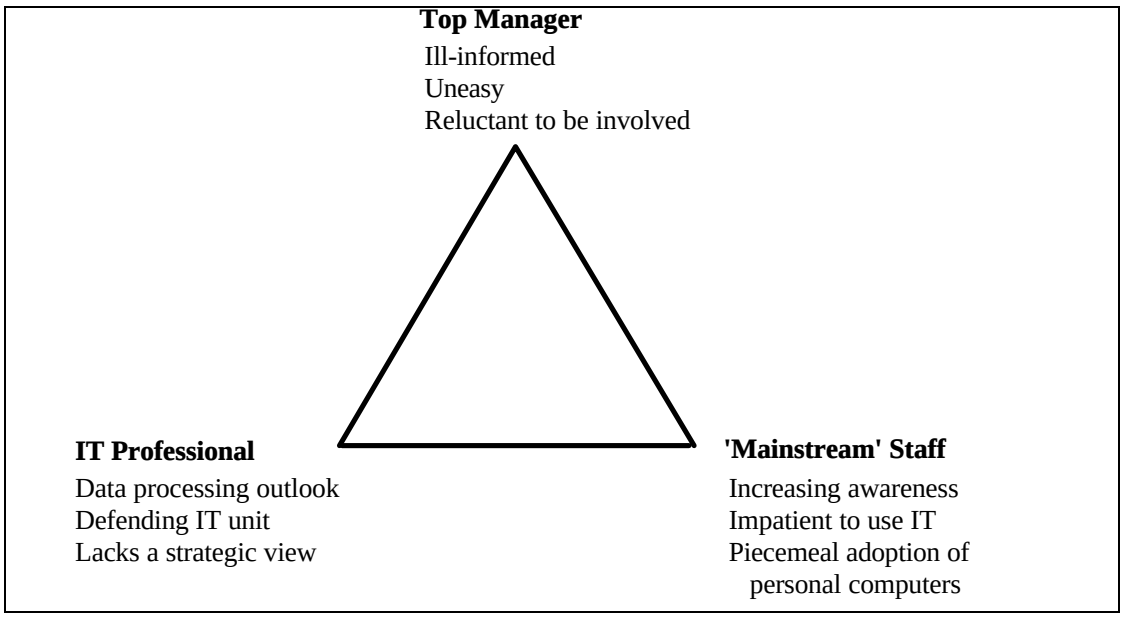
Barriers and antagonisms between decentralised units can undermine any hope of drawing them together for a centralised approach to information systems. At times, these barriers seem to derive from a 'them and us' attitude that is akin to modern-day tribalism. These cultural barriers are seen in the different mindsets that create quite different views of the world between groups; in the different jargon they use in communication; and in the different issues and people they value (de Kadt 1994). This makes it hard to centralise.

Lack of trust deriving from such barriers is seen to prevent the type of co-operation required for centralised approaches to information systems. It is, indeed, the IT business which has helped to spread *NIH*: the *not invented here* mentality that rejects information systems for the simple reason that someone else developed them.

Structural constraints

Structural barriers to centralised approaches in the public sector are found both within and between public sector organisations. One can perceive a three-way gap, as described by Knight & Silk (1990), and as summarised in Figure 2.

Figure 2: The 'ITernal Triangle' of Gaps Between Different Staff



Each of these three groups will be analysed in more detail, to see how all gaps in the triangle constrain the development of centralised approaches:

- *Top managers*: do not understand IT or its possible uses in their organisation. They will resist centralised approaches they fear they cannot understand or control.
- *IT staff*: do not understand the public organisation's business and are only really interested in the technology. This prevents centralised approaches being business-led, and leaves them being technology-led. Such approaches, if developed at all, therefore address only IT, not data or information systems or business objectives.
- *Mainstream staff* can be divided into:
  - *computer illiterates* who feel threatened by IT, its jargon and its association with change and the unknown; they will resist centralised approaches because of their fears, and
  - *computer literates* who want to pursue their own agenda without seeing the need for co-ordination of IT activities or for 'interference' from IT staff; they will undermine centralised approaches by trying to develop their own information systems.

  In addition, there may be members of the most difficult staff group – *semi-literates* – who think they know all about IT, are vocal in expressing their opinions, but who in practice understand little about the technology and nothing about information systems.

The gaps are partly those of objectives, of knowledge, and of culture, with each group talking a different 'language', holding different worldviews and/or interests, and not

trusting the others. However, gaps also relate to the public organisation's structures for information systems responsibility (Collingridge & Margetts 1994). For example, a centralised IS unit may remain independent with little involvement from mainstream managers unless it is explicitly staffed and structured to create that involvement.

These structural problems – especially when combined with political and cultural barriers – seem likely to increase during reform processes of decentralisation, privatisation and outsourcing that lead to fragmentation of public sector organisations (Bellamy & Taylor 1994). We are then faced with the paradox that public sector reform simultaneously increases the requirement for, but decreases the possibility of, centralised approaches to IS.

Summary of constraints

Some of these barriers also exist to decentralised approaches, and we should recognise them as *barriers to change in general* rather than to one or other approach. However, the barriers to centralised approaches appear greater and, the more strategic and centralised the approach, the greater these barriers are likely to be.

Disadvantages of centralised approaches

Even if the listed constraints were to be overcome, centralised approaches can produce some disadvantageous outcomes. One obvious disadvantage of a centralised approach – as already noted above – is the high level of overt resource costs. Other disadvantages are described below.

Heavy time consumption

Centralised decisions and actions are more time-consuming than a decentralised approach because of: the additional time it takes for information to flow up the organisation as an input to centralised decisions; the additional time it takes to collate information from a variety of different decentralised locations as an input to centralised decisions; and the additional time it takes for implementation information to flow down the organisation. The result can be inordinate delays in the process of information systems development (Wolfe 1999).

Limited ability to meet user needs

Centralised approaches necessarily mean that priority goes to those systems which are seen as important by some select and centralised staff group. The priorities of the periphery – both individuals and individual work units – may not be addressed (Hayward 1994). Consequences of this failure to meet user requirements may include:

- a backlog of user applications awaiting development,
- limited use or even total failure of centrally-planned information systems, and
- poor quality of data within these systems, since users will not be motivated to maintain data quality.

The frequent outcome is that end users subvert central controls and impose a *de facto* decentralisation.

Inflexibility

The greater the amount of central planning that has gone into an information systems decision, and the longer that decision is therefore intended to provide guidance for the organisation, the less flexibility it offers the organisation to cope with internal or external changes. The British Army fell into this trap when it produced its first IT strategy. The strategy document ran to 800 pages and created a 'strait-jacket of detail' that meant managers 'felt like prisoners of over-rigid procurement methodologies and … over-rigid IT strategies and management structures.' (Hayward 1997:36).

Increased dependence and vulnerability

In general, centralised approaches to information systems make public sector organisations more dependent and more vulnerable for a number of reasons:

- greater numbers of staff rely on single information systems,
- greater reliance on a few key staff who plan, develop and run those systems,
- greater technical complexity that makes problems harder to diagnose, and
- greater potential impact of data security breaches.

As a consequence management controls have to be far more rigorous (hence costly) with centralised systems.

B2. The Decentralised Approach to Public Sector IS Responsibilities

It would seem that centralised approaches to public information systems are highly problematic. What, then, of decentralised approaches? As technology has become smaller, cheaper, easier-to-use, more reliable, and more powerful, so decentralised approaches seem to be an increasing possibility. Decentralisation may also be driven by a desire to remove control from central IT units, or by its perceived advantages, which include those listed below.

Greater fit between systems and local needs

The closer the proximity of user and developer, the less the communication gap and the more likely it is that the developed system meets the users' real needs. At the extreme, where users are able to develop their own information systems, these are far more likely to meet their requirements than those developed by someone else.

Higher usage of computerised systems

This flexibility to fit local needs helps to explain the dramatic growth in computer use associated with decentralised approaches, such as end-user computing. Users are better motivated by such approaches and are far keener to take up computing when it directly supports their own interests and work.

Faster system development

The less the organisational distance between system user and system developer, the faster development of that system is likely to be. Again taking the extreme of end-user development, there will be no delay for the development of mutual understanding and no clash with higher priority information systems developments. This can help to overcome the staffing constraints and systems development backlog that often afflict centralised IS units. Other aspects of system use such as implementation, operation, troubleshooting and maintenance are also likely to occur more quickly under a decentralised regime.

Perceived lower costs

The 1990s have been characterised by a growing realisation that the costs of decentralised approaches are greater than anticipated because of many initially-

unrecognised indirect costs. Nevertheless, some still argue that decentralised approaches present lower costs than centralised approaches. This is thanks to faster development, less miscommunication, greater fit to local needs, the greater emphasis on smaller computers, the greater emphasis on buying software packages rather than developing software in-house, and so on.

Constraints to decentralised approaches

However, just like their centralised counterparts, decentralised approaches are also beset by problems, some of which are outlined below and in the following section.

As already noted, many of the constraints to centralised approaches described above are, in fact, constraints to change in general. They are therefore also constraints to a decentralised approach and will not be reiterated in detail. Examples include (Warner 1992, Braa 1996, Computing 1996):

- *Technical constraints*, such as heavy existing investments in a centralised system.
- *Resource constraints*, such as a lack of skills to support decentralised decision making and action on information systems.
- *Political constraints*, such as the unwillingness of those at the centre to change information flows, resource flows and associated organisational power.

However, it is rare for these constraints to be completely insurmountable, partly because of the great motivation of staff and individual work units to take some control over IT. At least some elements of IS decentralisation are therefore found in almost all public sector organisations.

Disadvantages of decentralised approaches

Even if the listed constraints are overcome, decentralised approaches can produce some disadvantageous outcomes.

Barriers to sharing data

Decentralised approaches can create information systems in different work units that are mutually incompatible. The resulting 'electronic concrete', like its centralised counterpart, constrains the scope of activities that organisations can undertake, or imposes substantial additional time and financial costs on those activities (Laudon & Laudon 1995). In particular, strategic, organisation-wide activities are constrained.

This can lead to anything from a difficulty in aggregating basic financial information across the organisation, to an inability to implement any strategic plans.

Barriers to sharing other resources, including human resources

There may also be an inability to share resources other than data if work units are allowed to set up their own separate systems (Oyomno 1996). It may be hard to exchange hardware and software. Perhaps more importantly, each individual information system requires a unique set of skills for system development, implementation and operation. This makes it much more difficult for staff to move between different systems.

Duplication of effort

Apart from constraining what public organisations can do, decentralised approaches also tend to be very costly because units will often duplicate what others are doing (Computing 1996, Computing 1998a). Duplication may cover:

- analysis, design and implementation of information systems,
- gathering and administration of data, and
- system operation, support and maintenance.

In addition, computer input, output, storage and processing capacity will all have to be duplicated.

The unnecessary duplication of data (known as *data redundancy*) tends to be particularly problematic, yet it is quite common. For example, public organisations often store basic details of their employees many times over:

- on paper and on computer, and
- for personnel, for payroll, for training, and for other records.

This imposes additional costs in gathering, maintaining and updating data. In addition, because data about similar entities is held simultaneously in two or more different locations, it tends to become inconsistent. No-one then knows which, if any, version of the data is the most accurate or up-to-date. Trying to put together a reliable record involves a lot of chasing around and cross-checking.

Lack of learning and control

In addition to the extra direct costs that duplication imposes, there is an indirect cost of lost learning opportunities and limited cross-fertilisation of ideas. Decentralised approaches also necessarily mean limited central ability to plan and control, leading to a tendency for some decentralised systems to be developed and used without due care (Wolfe 1999). The result may be a system that never works or does not work properly, with compromised data quality or system security.

Failure to achieve scale economies

As already noted, there are scale economies in information systems covering data, people, hardware and other resources. Decentralised approaches make all activities more costly, from buying computers to gathering data to training staff to system operation and maintenance (Computing 1998b).

Summary of problems

All of these problems can be largely summarised as: higher-than-desirable costs or a lower-than-desirable scope of public sector activities. The intangibility of many of the problems means that costs are not always recognised. For example, only in recent years have the true costs of end-user microcomputer ownership begun to emerge, with estimates up to US$10,000 or more per computer per year. Much of this is the cost of staff time taken up when users provide support to other users and when PCs are used for non-job-related or other unproductive activities. Training, maintenance and administration costs also contribute.

C. CONCLUSIONS: *Resolving The Contradictions Via A Core-Periphery Approach*

The review of experience presents some challenging contradictions. Both the centralised and the decentralised approach can provide benefits for public organisations. Yet, at the same time, such approaches can be hard or impossible to implement, and can produce serious disadvantages for the organisation.

What is the way out of this quandary? One way forward is the adoption of a core-periphery approach that attempts to reconcile the push of the centralised approach with the pull of the decentralised approach. It does this in two ways. First, through *integration*: drawing the centralised and decentralised approaches together into some kind of unified or compromise approach. Second, and more commonly, through *division*. This accepts that both centralised and decentralised approaches will be found, and then attempts to set some demarcation lines that will keep the two separate, thereby allowing them both to be accommodated.

A decentralised approach may be most economic for public organisations, because it saves on overt input costs. A centralised approach may be most efficient, because it avoids waste and duplication. But a successful core-periphery approach may be most effective because it can simultaneously provide:

- the control necessary to share key resources (including data), to avoid duplication, and to achieve economies of scale; and
- the freedom necessary to meet user needs, and to overcome blocks to IT usage and IS development.

C1. Core-Periphery Approach Content

What does all this mean in practice? In each of the eight identified areas of public sector IS responsibilities, a core-periphery approach will now be described.

IS planning

A core-periphery approach to IS planning involves strong and active participation of users and local units in the formulation of strategy. The planning process may then involve decisions about other elements of the core-periphery approach (see below):

planning which data items are generic and which are specific; dividing out responsibilities for information systems development; and so on.

In line with other core-periphery elements, such plans may also aim to guide more than dictate. The successor to the UK Army's 800-page strategy document cited above, for example, was only 30 pages long. It provided a guiding framework, allowing for flexibility and local initiative.

Organisational structures and staffing

A core-periphery approach may involve a separation of central and local responsibilities, as described below for areas such as data management and IS development. However, another strand can be an attempt to close the 'ITernal triangle' gaps identified above. For example, there is likely to be some central IS unit with a co-ordination role in this approach. It may have a management structure that involves end users and senior staff as well as IT staff. It may also be underpinned by a relatively open philosophy that looks outside the unit and regards the end users as its customers. This, for example, has been the philosophy adopted in restructuring IT structures across the South African public sector (Nkone 1998).

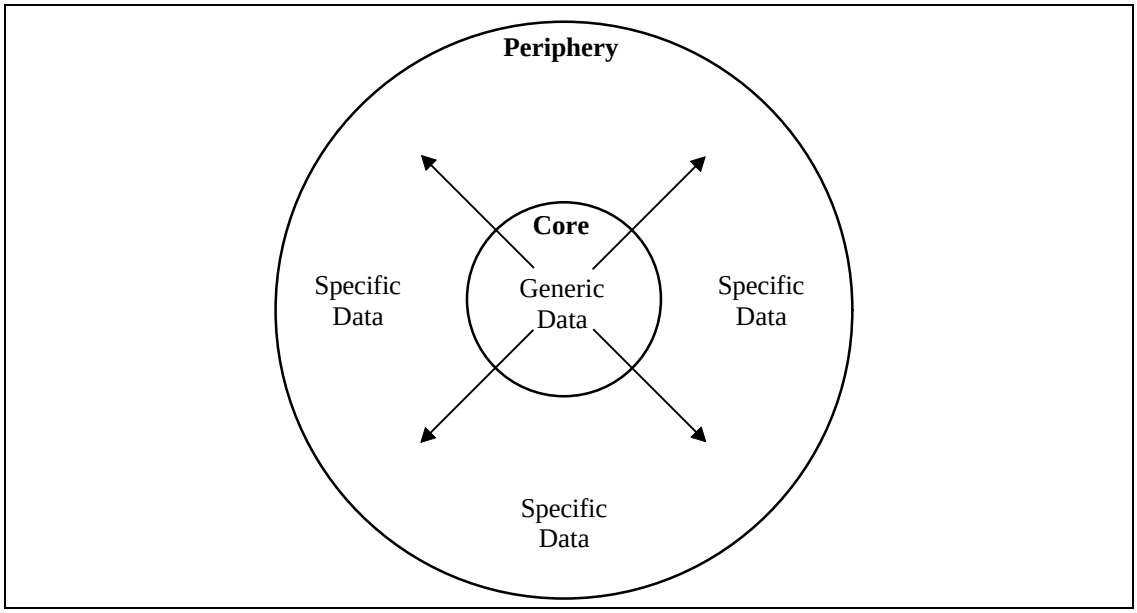
One common application of the customer-oriented philosophy is to create an 'end-user support centre'. This is essentially an internal extension/outreach unit. It reaches out from the centre to support users on the periphery and to help them make best use of their information systems and technology.

Another example of core-periphery approaches is the attempt to hire or create *hybrid staff*. They understand both the context and work of a public sector organisation *and* the role, management and jargon of information systems.

Data management

A core-periphery approach to data management typically involves a division of responsibilities, such as that which has been adopted across the Canadian government (Treasury Board Secretariat 1994). This division is illustrated in Figure 3.

Figure 3: A Core-Periphery Approach to Data Management



This division defines the centre's role as being the management of 'generic' data items (i.e. those used across all or most of the organisation). Typical generic data items would include those about organisational employees, finances, projects and services.

The periphery's role would be to:

- make use of generic data,
- alter generic data only within certain centrally-determined controls, and
- control 'specific' data items (i.e. those used only by individuals or small groups), for example, those within a database of personal contacts.

Computing and data management architecture

The most common core-periphery computing architecture is the client/server model, in which computing power is divided between the central servers and the local client workstations. This architecture has now been adopted by vast numbers of public sector organisations worldwide.

For organisations moving straight from a manual or stand-alone system to a client/server model, the main decisions to be made concern how power and resources are to be divided between the server core and the client periphery. Organisations moving from a centralised to a client/server architecture have an additional decision to make: what to do with the centralised system, which will often be mainframe-based.

There are three main choices:

- scrap the mainframe and move over fully to the client/server system,
- run two architectures in parallel, or
- make the mainframe part of the client/server architecture.

Information systems development

A core-periphery approach to systems development can involve a division of responsibilities, for example, defining certain types of information system as suitable for central development, and others as suitable for decentralised/end-user development. Decisions about how to classify project proposals for particular information systems can be made by a joint team of managers with technical staff input. This team will allocate central resources only to projects meeting agreed criteria.

Candidates for central development might be those systems where one or more of the following applies:

- the system is critical to the functioning of the organisation,
- the system is to be used by more than one department,
- data is drawn from several different sources, and/or
- there are particular technical issues such as a very large database or a need for a fast response time.

Such systems are seen as too important, too cross-cutting, and/or too skill-intensive to be appropriate for decentralised development.

Candidates for decentralised development might be those systems where one or more of the following applies:

- the system is relevant only to the individual user or department,
- data is drawn only from an existing centrally-managed database or from a proposed locally-managed database, and/or
- processing or reporting requirements are subject to frequent change.

Such systems are seen as too small and/or too specific to be appropriate for central development.

A slightly different perspective would aim to create a division of responsibilities within the development of each individual information system. Decentralised users might be responsible for systems analysis, training, documentation, and ongoing support.

Centralised IT staff might be responsible for design, construction, implementation, operation and maintenance of the system.

In the development of a new management information system to support reform of materiel requirements planning, for instance, the US Air Force Logistics Command involved users throughout the IS development lifecycle (Tripp 1991). Users were made responsible for current system analysis, requirements specification, review and acceptance of detail design, preparation of test data, setting of acceptance criteria and user acceptance. They were also involved with the testing and data conversion processes. Coupled with formal project management procedures, this helped to ensure a good fit between user needs and system outcomes.

Alternatively, the central role may just be one of quality assurance: end users or work sections are responsible for developing an application, but quality is assured in some way by the central IS unit. This may involve central guidelines on anything from development methods to data structures, or central testing of programs or documentation.

Finally, a core-periphery approach may also attempt to bridge internal divisions and have shared responsibilities for systems development. It might do this by creating structures that bring different groups together or through processes that allow these groups to communicate with each other. Such structures may involve participatory or prototyping techniques of systems development.

The Royal Netherlands Air Force adopted this last method through the mechanism of a management game involving the simulation of the entire organisational information system for a planned air base. Not only did this create a shared vision for change among participants, it also facilitated discussion of key issues, and created a sense of unity between those involved. As a result, this has been recommended as a standard approach to public sector change (Quanjel and Wenzler 1998).

IT acquisition

Standards for IT acquisition bring many immediate and obvious benefits to organisations. Unfortunately, they may be resented by users and can be circumvented relatively easily by users who have any local control over finances. This is a sensitive area because those who control the information technology tend to control the

information held by that technology. As we know this, in turn, is a component of organisational power.

A core-periphery approach to acquiring information technology therefore typically involves a mixture of 'carrot and stick': encouraging users to follow standards, and providing some limited sanctions for those who do not. It also typically involves a flexible approach to standards that allows users some local leeway within a set of boundaries. The US General Services Administration and the UK's CCTA/Government Centre for Information Systems both make use of this approach, essentially providing public agencies with a shopping list of discounted items via central framework agreements (ICA 1998). There is an 'opt in' model by which agencies can use these channels if they wish, but are not bound to do so.

Other elements of this approach may include:

- Reserving purchase of certain types of hardware (i.e. servers or all network hardware) for central decisions, or reserving purchases above some financial threshold for central approval, but allowing other purchases to be made by users. One intention here is to retain central control over the hardware that will form an organisation-wide technology infrastructure, such as telecommunications, but to relax other controls.
- Limiting the size of decentralised IT budgets. This avoids the extreme of a wholly centralised budget, which antagonises users and leads them to spend other budgets on IT. It also avoids the extreme of a wholly decentralised IT budget, which can lead to an unwillingness to fund any central services.
- Disseminating a set of minimum functional requirements (memory, disk size, chip, operating system capability, etc.) that all computers should meet, but allowing freedom of choice of model and supplier.
- Providing central advice, bulk purchase, installation assistance, training, and maintenance and repair services only for standardised hardware and software, but allowing users to diverge from this if they are willing to support themselves.
- Requiring that all networked IT conform to a certain specification, but allowing greater freedom for stand-alone information technology.
- Setting organisational standards for IT on a committee with strong user representation.

Other components

Other components of a core-periphery approach may include training and technical support.

Training

A common core-periphery approach is to centralise the planning of training for core information systems. Other training needs may be met, as requested, by end-user support centres or by informal training methods. There may also be central provision of access to open and flexible learning systems such as CD-ROM- or Internet/intranet-based training packages or videos.

Technical support

Given the very specialist nature of many repair and maintenance tasks, there are very high costs in leaving them to individual end users. Many organisations, therefore, have at least one IT support employee per department who takes on this role. Centralising this role even further can lead to response times and prioritisation that may seem poor from a user perspective. However, the more specialised the role, the more the arguments for centralisation.

In the case of both training and technical support (and other activities), consideration will have to be given to charges levied on work units or users for centrally-provided services. The benefit of charging (even a nominal sum) is that it induces users to take the services seriously. It will also transfer resources to the central IS unit. The problem of charging is that users may decide not to use the service, possibly creating additional costs for the organisation if equipment is then not used properly or wrongly repaired or left in an unusable condition.

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