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Topic (ii): Governance

## **IT AND THE BUSINESS – THE CSO EXPERIENCE**

### **Invited Paper**

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#### **I. INTRODUCTION**

1. This paper describes some experiences on the interaction between the central IT unit and business areas over the past decade as the CSO moved away from a mainframe IT environment, while expanding its staff numbers and statistical outputs. The examples outlined include governance and change management issues as well as lessons learnt for future enterprise initiatives. The paper will also focus on issues surrounding the delivery of corporate systems by the central IT unit and the independent evolution of IT systems in business units in the same period.

#### **II. THE CENTRAL STATISTICS OFFICE**

##### **A. General Organisational Background**

2. The CSO is 60 years old in 2009 and has offices in two locations in Dublin and one in Cork City. It has a staff complement of over 900 of which approximately 140 are professional statisticians. The number of statisticians has increased four-fold since the early 1990s. During the same period the number of application developers in IT Division has more or less remained at 30 while the IT Infrastructure support team has grown from 12 to 30+ which reflects the move from a mainframe environment to a client server environment.

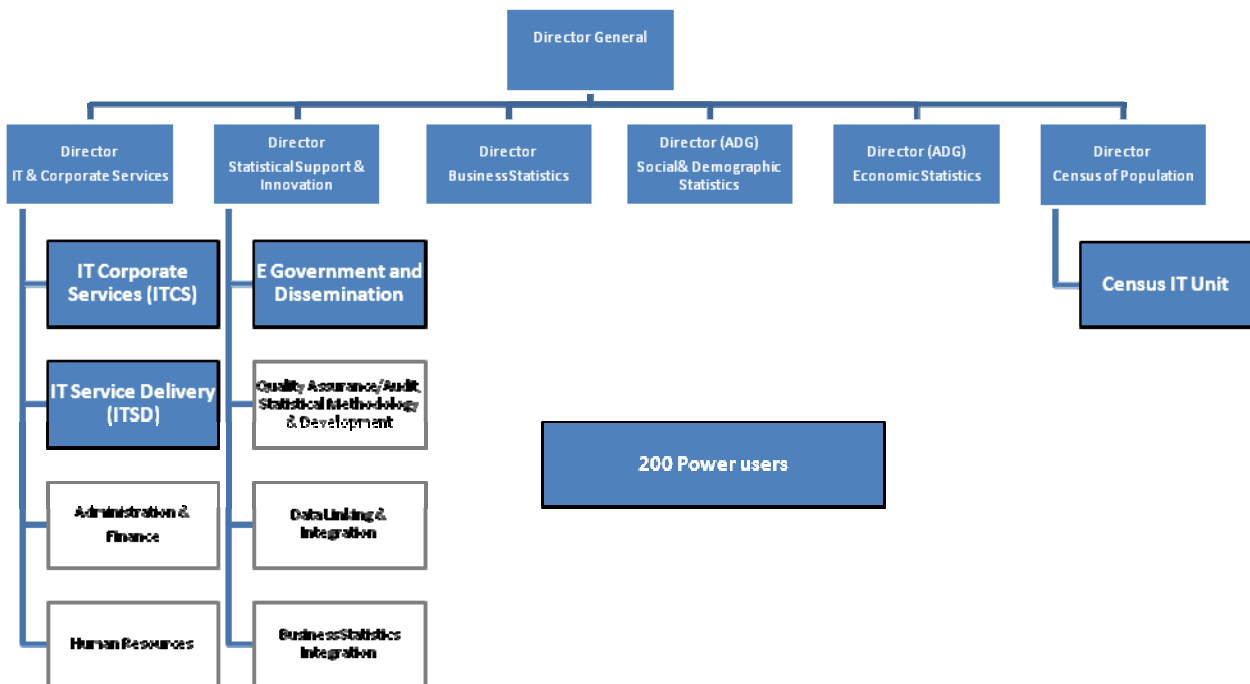
##### **B. Organisation of IT resources within the CSO**

3. The current high-level organisational structure of the CSO, in place since 2007, is described in Figure 1 which also shows the divisional structure of IT. Most IT functions are located in the IT & Corporate Services directorate. IT Service Delivery (ITSD) division has responsibility for day-to-day delivery of Network and Desktop support, Database Administration and Service Desk support. IT Corporate

Services (ITCS) division is focused on development and support of centrally-developed corporate applications.

4. The Statistical Support and Innovation directorate has responsibility for e-Government initiatives including online collection and dissemination of statistics via the CSO website ([www.cso.ie](http://www.cso.ie)). This directorate also has responsibility for methodological development, quality assurance and for two data integration units whose main role is to extend the statistical use of administrative data sources.
5. Ireland undertakes a Census of Population every five years and, given the scale and specialised requirements of the census, a specialised IT unit is also located in that directorate.

**Figure 1: Organisation of IT within the CSO**



6. While the bulk of IT services are provided by the ITSD and ITCS divisions, the overall IT organisation could be described as “loosely federated”. An important element of this loose federation is the internal user community numbering about 200 “power users” in business areas, undertaking processing and analysis using centrally developed systems such as the CSO’s Data Management System (DMS)<sup>1</sup> and end-user tools such as SAS and, to a lesser extent, Excel for survey processing.

### C. CSO Corporate Strategy and Objectives

7. This section reviews the key strategic issues facing the CSO at corporate level and how they impact on the IT strategy and the delivery of IT services to the organisation.
8. The high-level goals and corporate priorities in the Office’s *Statement of Strategy 2008 – 2010* include:
  - (a) *Improvement in the scope, quality and timeliness of our statistics*: across almost all statistical domains, there is an increasing demand for statistical outputs to inform national and EU policies;
  - (b) *Developing the Irish Statistical System*: working with other departments and agencies, making greater statistical use of administrative data sources;
  - (c) *Reducing response burden*: co-ordination between data sources, data linkage and integration, electronic reporting, measuring and monitoring the burden;

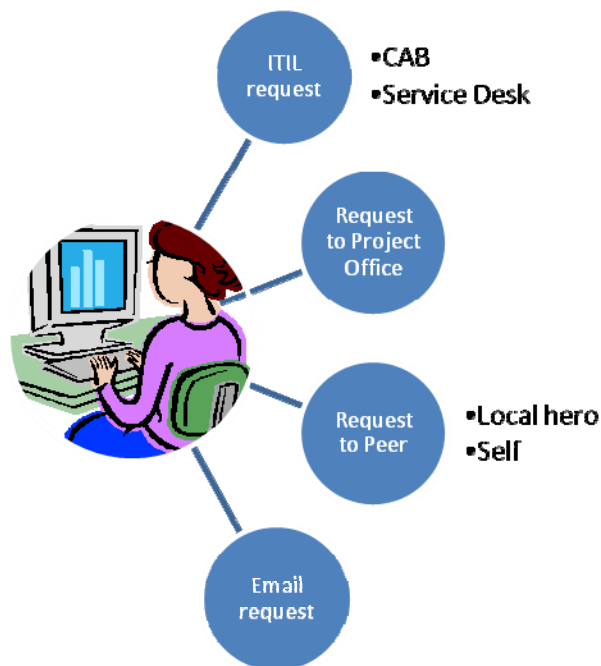
- (d) *e-Government*: electronic collection of data, development of the CSO website and statistical products;
  - (e) *Efficient work practices*: including greater functional integration of survey activities.
9. In an address to senior managers and staff towards the end of 2007, the Director General acknowledged the central role of IT in delivering current outputs and enabling future development. He also emphasised the IT, statistical and personnel challenges facing the Office as:
- (a) The DMS provides a robust modern platform for statistical processing but is not a complete solution and there will always be new statistical application requirements;
  - (b) The CSO can build on its strengths (e.g. SAS) to meet new strategic needs;
  - (c) The development and maintenance of the Office's IT skills base (IT specialist and end-user skills) is of paramount importance;
  - (d) The IT strategy needs to be business-driven and this should also be reflected in governance and communications processes;
  - (e) Improved Quality Assurance in line with the ESS Code of Practice;
  - (f) Review the CSO's dissemination approach with a particular focus on technology and changing user needs;
  - (g) More formalised development of new professional staff.
10. Another important issue highlighted by the Director General was the age profile of CSO staff. At senior management level, many of the professional cohort who joined the CSO in the 1970s are now approaching retirement. The Office needs to ensure that their institutional knowledge is preserved and passed on to the next generation. More recently, the Government has introduced an early retirement scheme which may accelerate the anticipated "brain drain" of senior experienced staff.
11. On the other hand, the CSO now employs about 140 professional statisticians, with 66 of these recruited in the past five years. These two factors – pending retirements of senior staff and a much larger number of more junior professional staff – have implications for training and professional development, in relation to statistical expertise, IT and other functions.
12. Since the 2008-2010 corporate strategy was written, the CSO's operational environment has changed. For the foreseeable future the Office can expect to work in a tighter budgetary climate with the ongoing expectation of "*Doing more with less*" – a theme no doubt familiar to other NSIs. In this changing environment, the CSO will still be expected to deliver new statistical outputs, to publish results faster, to produce innovative dissemination products, and to reduce the burden on respondents.
13. The CSO Senior Management Committee (SMC) commenced a strategic organisational review at the end of 2008, to examine ways on how the Office can continue to advance corporate goals and challenges in this changing environment. The outcome of the review, which is due to be completed this month (May 2009), will be a Plan for Business and Organisational Development.
14. This plan will be a key input to the next IT strategy, for 2010-2012. It may lead to changes in the organisational structures described above. It will certainly generate IT application development and IT strategy requirements. The application development requirements – driven mainly by the corporate goals relating to statistical outputs, burden reduction and integration of data sources – are likely to be far-reaching.

#### **D. Governance and Organisational Culture**

15. This section describes some key features of IT governance and the general corporate culture of the CSO; and considers how these have had an impact on the implementation of major IT projects. In particular, the focus will be on the adoption of enterprise-wide standards and systems. In the CSO, enterprise-wide projects over the past ten or so years have included:

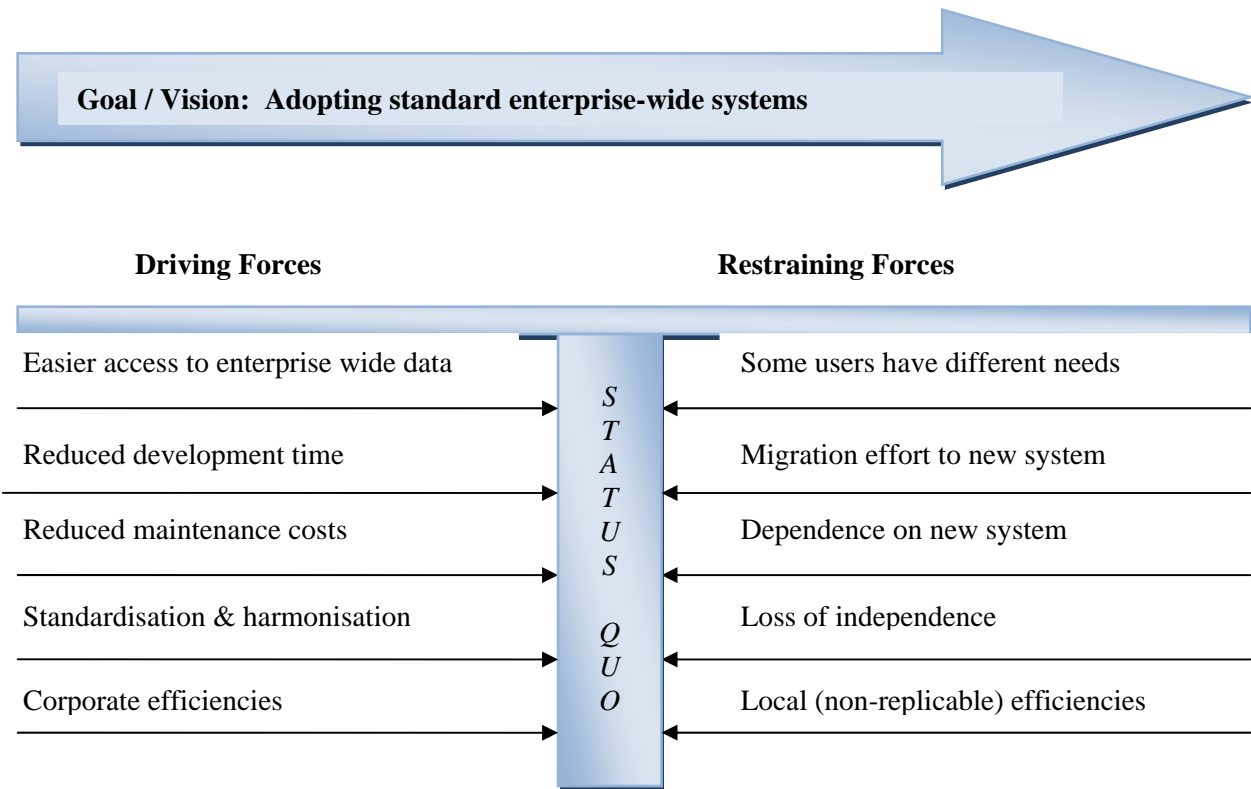
- (a) Moving from a mainframe to a client-server architecture;
  - (b) Installing enterprise groupware for e-mail and document management;
  - (c) Creation of a Corporate Data Model (CDM) defining the business principles for data storage and processing at each step of the statistical value chain;
  - (d) Implementation of a Central Business Register (CBR) and Classification And Related Standards server (CARS)
  - (e) Implementation of the DMS for survey processing.
16. Common characteristics of the above projects included their enterprise-wide scope; their alignment with high-level corporate objectives; and the need for “buy-in” and effort by users to assure their success. While the extent of the buy-in needed varied depending on the complexity and extent of the project, this factor was found to be most important in assuring long-term success of projects.
17. Since 2007, the corporate approach to IT service delivery has been based on the ITIL model. In that year, a centralised Service Desk was set up as a “one stop shop” for IT incident and change management. Together with this, ITSD division introduced a customer charter - effectively a Service Level Agreement (SLA) with the business; and a Change Advisory Board (CAB) was also established to prioritise tasks and resources.
18. The introduction of the ITIL framework complemented existing project management structures, in which the Project Office (part of the IT & Corporate Services directorate) assists business and IT managers in project documentation and monitoring. The Project Office provides monthly progress reports on major projects to the SMC and the Service Desk provides more operational metrics on the extent and effectiveness of internal IT services.
19. The organisational culture in the CSO tends to be informal. There are historical reasons for this – the relatively small size of the Office and, in particular, the professional cohort who joined the Office in the 1970s and now make up a large part of the senior management team. An informal work environment has advantages, in enabling good communications / networking and promoting a flexible “can-do” attitude. These characteristics have served the CSO well in advancing change.
20. However, there are disadvantages to informality and there is some degree of tension between the need for formal structures and processes to manage IT services, on the one hand, and the demand for flexibility and autonomy in using those services, on the other.
21. Figure 2 illustrates the different “pathways” taken by users, to request IT services (either day-to-day services or new projects). The first “pathway” – ITIL request – is the formal and recognised route; the rest are informal and, in some cases, are outside of any central IT-delivery model. In practice, these informal pathways are extensively used.

**Figure 2: Logging a request for IT service**



22. Often, users prefer to take an informal approach even for significant change issues. Why is this? Force field analysis (Lewin, Kurt, 1951)<sup>ii</sup> can help to give a sociological perspective on the relevant behaviours and give an insight on the dynamics of organisational change initiatives.
23. This technique is based on the concept that for any new project or initiative there is a goal or vision, together with associated driving and restraining forces which will determine whether this goal or vision can be achieved.
24. Driving forces are aligned with the goal or vision and will therefore help to achieve it. Restraining forces tend to hinder goal achievement. At some point, driving and restraining forces are in equilibrium. This is illustrated in Figure 3 by the vertical line labelled “*Status Quo*”. Driving forces move an organisation from the *status quo* in the direction of the specified goal or vision. Restraining forces hold back the desired change. The relative strength of the driving or restraining forces determines the extent to which (or indeed whether) change occurs.
25. Figure 3 below sets out a possible field force analysis for adopting standard enterprise-wide systems in the CSO. It describes some of the driving and restraining forces which affect the adoption of such systems. The driving forces described in Figure 3 largely reflect corporate outcomes of the desired change; and the restraining forces reflect constraints at user level. It should be emphasised that driving and restraining forces are not necessarily always aligned in this way ( i.e. driving and restraining forces do not exclusively “belong” to any one part of the organisation).
26. An important use of the field force model is to gain an understanding of how the Office can promote shared ownership of corporate objectives such as the implementation of enterprise-wide systems. To make change more likely to succeed, it is necessary to either strengthen the driving forces or reduce the restraining forces. Weakening the restraining forces is sometimes a more subtle and ultimately better approach, as actions to strengthen the driving forces may also make the restraining forces stronger. Such actions – e.g. a “top-down” push to implement a corporate change may be met with stakeholder resistance.

Figure 3: Field force analysis for adopting standard enterprise-wide systems



27. Ameliorating the restraining forces can be a more effective way of gaining user “buy in” and successfully completing a corporate change project – e.g. by listening and responding to users’ concerns; communicating the corporate and individual benefits of the initiative; making provision for the migration effort required of users; and providing relevant training and support. The experience of the CSO in a variety of IT change projects, spanning the past ten years, supports this view. This is a challenge for both IT and the business.
28. The challenge for IT is to provide systems which are effective in meeting corporate / business needs. Communications and dialogue are an intrinsic part of this service. The challenge for the user is to realise the benefits of corporate standards and systems.

#### E. How Quality Assurance can help

29. The European Statistics Code of Practice <sup>iii</sup> comprises fifteen principles on the organisation of official statistics, spanning the areas of institutional environment, sound methodology and statistical output. Principles 4, *Quality Commitment*, and 12, *Accuracy and Reliability*, include indicators which are directly relevant to quality assurance and good governance. The indicators of compliance with these two principles include the following:
- Processes are in place to monitor the quality of the collection, processing and dissemination of statistics;
  - Source data, intermediate results and statistical outputs are assessed and validated.

30. These indicators suggest that controls should be place to ensure the quality of statistical outputs. The main resources used by NSIs to produce data are:
- a) Staff – specifically covered in Principle 7, *Sound Methodology*. Here it is stated that “graduates in the relevant academic disciplines are recruited”;
  - b) Information Technology – the Code of Practice does not include specific indicators for what is expected in the area of IT usage by NSIs.
31. The text of Principle 12 includes the requirement that “*data ... outputs are assessed and validated*”. The CSO’s internal audit section has posed the question: how can outputs be validated without reference to the IT systems used to produce them? The audit unit<sup>iv</sup> has suggested that, as for other steps or elements of the statistical production process, there is a need for IT quality assurance to form part of the overall validation process for statistical outputs.
32. In general, IT systems are either developed centrally or by end-users. Centrally-developed systems exhibit closer levels of compliance to industry standards for system development and maintenance, as the persons developing these systems have a formal background and training in IT. As mentioned in Section B above, power users form a large and important element of the CSO’s overall IT community. Consequently, there continue to be many user-developed systems and applications. The range of system development experience and ability among user-developers introduce risks to the operation of end-user IT systems for data production as follows:
- (a) System development not centrally managed, with consequent lack of standards in the operation;
  - (b) Systems developed on an *ad hoc* basis and not to a formal system development standard, impacting on whether adequate testing of the new system is performed or not;
  - (c) Lack of adequate change control processes;
  - (d) Substandard or missing system documentation;
  - (e) Difficulties in controlling access to end-user developed systems and associated data files.
33. The CSO internal auditor argues that these risks are indeed real and need to be addressed as part of the quality management of the Office’s production processes. He quotes from Chan, Gupta & Leech, 2006<sup>v</sup> “*When user-managed computing activities are critical to ... reporting, it is only appropriate to exercise formal controls or to justify why these controls were not implemented. It is also prudent for users to ... rethink why these activities are not formally migrated to environments where general IT controls are applied and managed by the IT function.*”
34. End-user computing can use a wide range of software tools – in the CSO mainly SAS and Excel. However, the use of spreadsheets for statistical production, particularly when many spreadsheets are being updated and/or linked, is acknowledged to involve high degrees of risk. Again quoting from Chan, Gupta & Leech from some recent work by the internal auditor: “*Without a doubt, spreadsheet errors are both common and non-trivial. Research conducted by PWC discovered that just over 90% of spreadsheets have at least a 5% error margin. Other research and industry studies have concluded the same.*”
35. Examples of the specific risks which can be encountered in production systems based on spreadsheets, without adequate quality management, include:
- (a) Absence of testing of spreadsheets – their overall operation and the links and formulae they use;
  - (b) Absence of cross-checking of totals and in general an absence of data quality control (for example data validation / edit rules);
  - (c) Spreadsheet development – problems with or lack of change management and version control;
  - (d) Spreadsheet reconciliation with working papers – absence of audit trails, including system documentation;
  - (e) Use of ‘cut & paste’ without checking that the output is as intended;
  - (f) Absence of peer review of spreadsheets before deployment.

36. In the CSO, the Economic Directorate has acknowledged that the compilation of the National Accounts can no longer continue to be undertaken using interlinked Excel spreadsheets. They have recently begun migration of some of these spreadsheet systems to a new SAS system developed internally as well as concluding an understanding with Statistics Norway on using part of their SAS-based system for compilation of National Accounts. This is an initiative where the end user has decided to relinquish the system they developed themselves because of the inherent risk in the system as the number of linked spreadsheets increased.

#### **F. “IT and the Business” – Lessons for CSO’s IT Strategy**

37. As the Office finalises its next IT strategy there is an opportunity to develop a strategy for governance that will ensure participation on a sustained basis by key participants. Because IT governance's purpose is to ensure that the Business meets its goals, IT governance must be driven by the business strategy. This is to enable an IT governance strategy to be developed that is driven by, and has the goal of, "ensuring the effective and efficient use of IT in enabling an organization to achieve its goals" - Gartner definition of IT Governance.
38. Gartner advises that for IT governance to be effective over a sustained period of time, it is more likely to succeed the more it reflects the culture and decision-making style of the organisation and the more it is integrated with existing decision making and operational management processes. In addition IT Governance must be realistic and practical. This can be best achieved by integrating it with existing decision-making processes so that it reflects the organisational and management culture.
39. Returning to Figure 2 above, this may mean that the Office should integrate some of the present informal pathways to IT services and incorporate the resulting consolidated pathway into its IT governance and communication structures. This could involve a more explicit assignment within IT of customer service roles and responsibilities, including the establishment of a Business Intelligence Competency Unit. This unit would help to ensure that there is a constructive dialogue between IT and the Business.
40. Whatever changes are made to streamline the governance process, business buy-in will be vital. The alternative pathways shown in Figure 2 indicate a lack, in many instances, of business buy-in to good governance. A comprehensive plan for the implementation of the IT strategy is crucial not only to address the design of the IT governance process and support mechanisms, but also the culture/change management aspects that are necessary to ensure that all participants are clear on process responsibilities and accountabilities.
41. The new IT governance process needs to be managed and monitored to ensure its effectiveness. IT governance requires a “champion” to promote its worth and maintain interest. It could be said that this aspect of managing the IT governance process was neglected in the past by the CSO.
42. The role of IT governance must be communicated to and accepted by all parts of the Business if a sustainable efficient and effective governance process is to be achieved. It is only when all of us in the CSO “walk the walk and talk the talk” that we are likely to achieve business benefit realisation.

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<sup>i</sup> <http://www.unece.org/stats/documents/ece/ces/ge.50/2008/wp.2.e.pdf>

<sup>ii</sup> Lewin, Kurt, (1951) Field Theory in Social Science, New York, Harper and Row.

<sup>iii</sup> [http://epp.eurostat.ec.europa.eu/portal/page?\\_pageid=2273,1,2273\\_47141302&\\_dad=portal&\\_schema=PORTAL](http://epp.eurostat.ec.europa.eu/portal/page?_pageid=2273,1,2273_47141302&_dad=portal&_schema=PORTAL)

<sup>iv</sup> <http://q2008.istat.it/sessions/paper/32McSweeney.pdf>

<sup>v</sup> Chan, Gupta & Leech (2006), Sarbanes-Oxley – A practical guide to implementation challenges and global responses, London: Risk Books, pp 75 & 78.