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Amaratunga, RDG, Haigh, RP and Baldry, D

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Structured Process Improvements in Facilities Management Organisations: Best Practice Case Studies in the Retail Sector

Dilanthi Amaratunga* (r.d.g.amaratunga@salford.ac.uk) ,

Richard Haigh* (r.p.haigh@salford.ac.uk) ,

David Baldry* (d.baldry@salford.ac.uk)

*Research Institute for the Built and Human Environment, The University of Salford, UK

Abstract

Facilities management is a key managerial discipline and large corporations are increasingly recognising its importance in respect of achieving organisational goals and objectives. Enterprises are able to improve their performance by the more effective use of resources, the matching of appropriate support systems to business activities, and the application of assertive management by those best qualified and equipped to carry it out. However, FM organisations lack clear guidelines to direct their improvement efforts and to benchmark their performance against other organisations. The SPICE FM (Structured Process improvement in construction environments – facilities management) maturity framework was developed as a response to this requirement. SPICE FM draws a distinction between FM organisations that have ‘mature’ or well-established processes, and those where the processes are ‘immature’. This paper briefly describes the characteristics of the SPICE FM Framework, followed by a review of the key findings from the case study undertaken.

Keywords: facilities management, SPICE, process capability assessment, performance

1. Process Thinking in FM

A process has several essential features, which Ould (1995) [1] lists as follows:

- A process involves activity. People or equipment do things.
- A process also generally involves more than one person or piece of equipment. A process is therefore about groups, and concerns collaborative activity.
- A process has a goal. It is intended to achieve something and to produce results.

A process determines the way we act and react. The activities and tasks we perform to achieve a certain goal form the “process” for achieving that goal. A disciplined process will result in ordered and consistent patterns of behaviour, whether by individuals or by groups of people. The process defines how we act or react, or it defines the activities needed to fulfil a certain task. We have a process for ‘going to work’, a process for ‘defining service standards’, and so on.

In this context, most FM organisations focus on the services they provide. In such a business culture, people are naturally inclined to emphasise issues that are tangible, visible or measurable. Many organisations are likely to resist process improvement activities that do not contribute to short-term tangible results. Consequently, FM managers often view process related work as low priority. In contrast, process-focused organisations consider tangible results in service delivery to be just one aspect of the business picture. For such organisations, how the service is delivered is equally important. The objective is that process thinking should be accepted and used consistently. The process is seen as a disciplined way of conducting business. In contrast to functional definitions, a process perspective in FM focuses on the tasks and activities that take place internally in the FM organisation. The emphasis is on how the work is done, rather than the functional responsibilities.

In this context, SPICE FM is primarily concerned with management FM processes. The underlying philosophy is that if management processes are well performed, they will have an impact on the performance of core processes. SPICE FM does not prescribe how organisations should perform core processes. Instead, it focuses on creating a management infrastructure that allows members of staff to perform core processes successfully.

2. SPICE frame work

The SPICE FM process maturity model promotes continuous process improvement based on many small, evolutionary steps. It provides a system for initiating and implementing continuous improvement. The model divides these evolutionary steps into five maturity levels, which lay the foundations for continuous process improvement. The maturity levels form a scale for measuring the capability of an FM provider's management processes. Each level of maturity is defined by a set of key processes. When an organisation is successfully applying each key process, it can stabilise an important part of the service delivery process and achieve the next level of maturity. The five levels also provide guidelines on how to prioritise efforts at process improvement. Figure 1 illustrates the five stages of the SPICE FM framework. For each level, the model specifies a number of 'key processes'. By following the steps in the model, an organisation can achieve effective and continuous improvement based on evolutionary steps. An organisation can only be at one level of the model at any one time. If an organisation is at level 1, but implements some of the key processes of level 3 or 4, it is still considered a level 1 organisation. This is because each level lays successive foundations for the next. An organisation has little to gain by addressing issues at a higher level if all the key processes at the current level have not been implemented. To date, the research has focused on defining the characteristics of Levels 1 and 2 of the model.

2.1 Stepwise improvements in organisational maturity

The process maturity model lays foundations for continuous process improvement, by establishing controls on service delivery *management processes* before focusing on technical issues. Starting with ad-hoc processes, the evolutionary 5-stage model guides FM

organisations towards developing their process capability. In the SPICE FM framework, organisations at level 1 have little process focus. Organisations at level 2 have achieved high capability in managing service delivery. Level 3 focuses on knowledge management and sharing best practice across the organisation. In levels 4 and 5, the model introduces statistical controls and measurement. Level 1 of SPICE FM is the entry to the framework and has no key processes. Organisations at level 1 focus on achieving the seven key processes at level 2. This lays the foundation for the key processes at the next level. Each key process is defined by a set of critical practices that indicate if the process has been implemented in a way that is effective, repeatable and lasting.

Table 1 lists the key processes at level 2 and their “enablers”. The SPICE FM approach is not prescriptive in terms of how activities are performed. Instead, the model focuses on the broader issue of process management. Effective process management encourages and supports innovative approaches to solving day-to-day business problems, rather than constraining organisations to a particular way of working.

Figure 1: The SPICE FM process maturity model

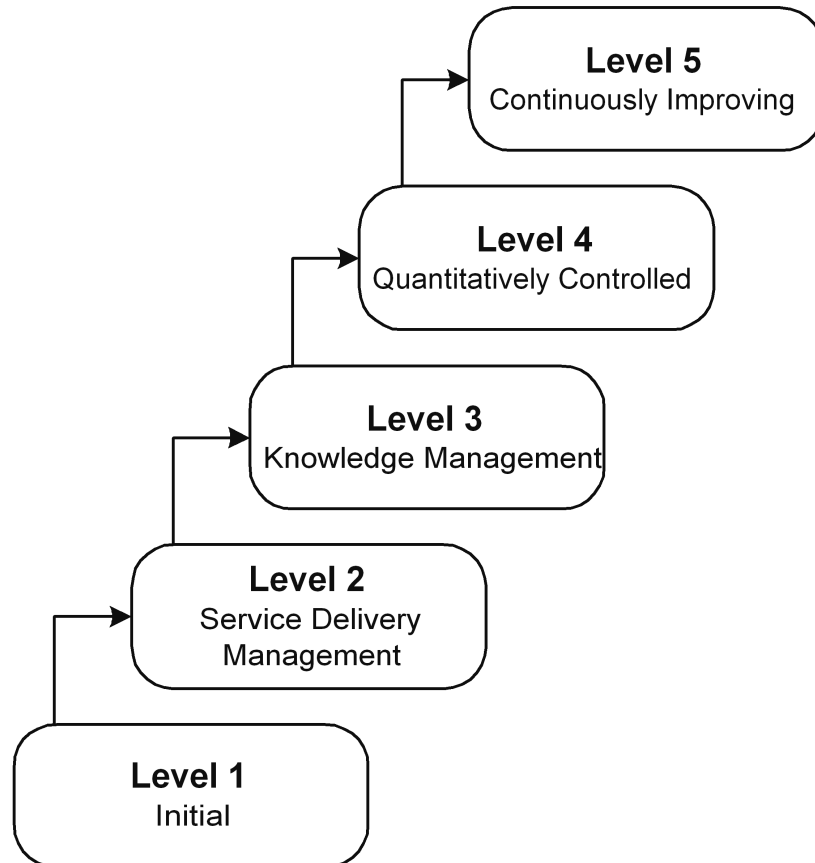


Table 1: Level 2 key processes and their enablers

| Level | Key Process Areas | Generic Process Enablers |
|---------------------------------|--|---|
| 2 - Service Delivery Management | Service Requirement Mgt. Service Planning Service Performance Monitoring Supplier and Contractor Mgt. Health and Safety Management Risk Management Service Co-ordination | Commitment Ability Activities Evaluation Verification |

2.2 Level 1 – Initial

Level 1 is the basic entry level to the model, and has no key processes. An FM provider at this level has little focus on process, and service performance is poor. Good practices are local, and are not repeated or ‘institutionalised’ across the organisation. The ineffective capture and co-ordination of service requirements tends to undermine good practices. Organisations make commitments that staff or the supply chain cannot meet, which results in crises. During a crisis, facilities managers typically abandon planned procedures; instead, individuals do whatever activities it takes to get the job done, with little regard for the effects on other people. Time, cost, quality and customer satisfaction may all suffer. Level 1 organisations must implement all of the level 2 key processes in order to progress, or ‘mature’, to the second level of the model.

2.3 Level 2 – Service Delivery Management

At this level, service performance can be predicted to a certain degree. A level 2 organisation has established policies and procedures for managing and delivering customer requirements. Service performance standards are established, and service delivery is co-ordinated to minimise disruption to the core business. As the service is being delivered, continuous monitoring ensures that performance standards are met. At level 2, FM providers have effective processes to directly meet the requirements of the core business. An effective process is one that is practised, enforced, trained, documented, evaluated and able to improve. To date, most of the efforts of the SPICE FM project have concentrated on defining and raising confidence at level 2 of the model. The research has identified seven key processes at level 2 which are described below.

- **Service requirement management** - Effective management of customer requirements identifies the needs of the organisation and its users. The service delivery team identifies how many tiers of customers it has and how their requirements differ. The team has a

clear sense of priority in term of its customers and the service mixes it offers. Service level agreements and performance standards are developed and continuously reviewed to remain consistent with customer requirements. They are also communicated to all staff involved in service delivery.

- **Service planning** - Service planning establishes realistic schedules of work based on customer requirements. Estimates (e.g., resources, maintenance schedules, budgets, purchasing) are prepared for all work to be performed (e.g., scheduled and reactive maintenance).
- **Service performance monitoring** - Service performance monitoring ensures that services are delivered in a manner that is consistent with the service level agreements and performance standards established with the customer. Feedback is gathered (e.g., from customers and staff) to monitor customer satisfaction levels. Performance measures (e.g., waiting times, error rates, processing times) are reviewed on a regular basis, with the involvement of staff, and corrective action is taken when service delivery deviates significantly from service plans.
- **Supplier and contractor management** - This key process starts with the selection of suitable suppliers and contractors. Service level agreements and performance standards are established and their performance is continuously reviewed.
- **Health and safety management** - Health and Safety Management ensures that services are delivered in compliance with, or exceed, all mandatory health and safety legislation. Health and safety risks are identified, assessed, and action taken to eliminate or minimise the likelihood of any incidents.
- **Risk management** - Risk management involves identifying and evaluating risks so that action can be taken, either to reduce the likelihood of an event occurring or to limit the consequences should that event occur. Risks are identified in all areas of the business (e.g., to the environment, supply breakdown, property, financial performance). Employees are actively involved in identifying risks and taking steps to prevent risks becoming a reality.
- **Service co-ordination** - Service co-ordination draws on the experience of other service teams, suppliers and customers to meet customer requirements effectively. Co-ordination between these three groups ensures that disruption to the core business is minimised. Representatives with responsibility for co-ordination are appointed, and co-ordination methods are agreed.

2.4 Level 3 – Knowledge Management

A level 3 organisation builds on the achievements of level 2. At this level, the organisation has the capability to capture and share knowledge across the organisation. So far, the SPICE FM research has had less focus on level 3, which is anticipated to be the subject of future research.

2.5 Level 4 – Quantitatively improved & Level 5 - Continuously improving

So far, the SPICE FM research has had little focus on level 4 and 5. At Level 4, the organisation will have a programme that measures productivity and quality for important process activities related to service delivery. This programme forms an objective basis for measuring the process, customer satisfaction, and harmony across the supply chain. Organisations gain control of service delivery by narrowing variations in process performance, so that they fall within acceptable boundaries. Meaningful variations can be

distinguished from random variations. The expectation at level 5 is that the entire supply chain is focused on continuous process improvement. Level 5 organisations can identify weaknesses and strengthen processes before any problems emerge, and can do so in a collaborative manner. Data on the effectiveness of the process is used to perform cost benefit analysis on any new technologies and on proposed changes to processes. This increased level of understanding allows organisations to consider large-scale changes to their processes. Innovations that exploit best practice are identified and adopted throughout the organisation.

3. Process Enablers

Anecdotal evidence from the research suggests that if managers are asked: "Do you implement level 2 key processes?" they are likely to respond "yes". On the other hand, current studies indicate otherwise. So how can managers ensure that they are performing the key processes adequately? The SPICE FM research has identified five process enablers, which are either activities or modes of thinking. These enablers are pre-conditions for implementing the process. They are based on principles established in CMM[®] [2] and SPICE [3] that were developed for the software engineering and construction sectors respectively. Process enablers focus on the results that *can be expected* from a key process. This is a forward-looking approach, which indicates an organisation has process capability *before* a process takes place. Process enablers detail the features a key process must have before it can yield successful results. Ensuring that all the process enablers are in place improves the performance and predictability of key processes. Process enablers apply across all the key processes.

- **Commitment** - This involves an organisation taking action to ensure that the process is established and is lasting. Typically, this means establishing policies that are shared by the whole organisation. Some processes need sponsors or leaders in the organisation. Commitment ensures that leadership positions are created and filled, and that the relevant organisational policy statements exist.
- **Ability** - This describes the conditions that must exist before a process can be implemented competently. It normally means having adequate resources, an appropriate organisational structure, and training in place.
- **Verification** - A verification procedure checks that activities are performed in compliance with the agreed process. Adopting such verification checks as a process enabler emphasises the need for independent quality assurance. The focus is on *external* verification of processes.
- **Evaluation** - This involves internal process evaluation and reviews to help control and improve processes. During the early stages of maturity, this will mean efforts by the team to improve existing processes. The focus here is on the project team's *internal* improvements.
- **Activities** - This describes the activities, roles and procedures necessary to implement processes. They typically involve establishing plans and procedures, performing the work, tracking it, and taking corrective

4. Core, support and management processes

Business processes can be divided into three broad types: (i) core processes; (ii) support processes; (iii) management processes. Core processes concentrate on satisfying customers. They directly add value to the product in a way that clients understand. These processes respond to the needs of customers and generate customer satisfaction. Support processes concentrate on satisfying ‘customers’ within the organisation. They might add value to the business indirectly, by supporting a core business process, or directly, by providing a suitable environment. Management processes are concerned with managing the core and support processes. SPICE FM is primarily concerned with management processes. The underlying philosophy is that if management processes are well performed, they will have an impact on the performance of core processes. SPICE FM does not prescribe how organisations should perform core processes. Instead, it focuses on creating a management infrastructure that allows members of staff to perform core processes successfully.

5. SPICE Applications in the Retail Sector

The SPICE FM framework described above was tested in a series of case studies with FM providers to ensure that its outputs are appropriate to the FM sector and of value in the real world. Members of the research team worked closely with FM providers and clients to test the SPICE FM framework in a variety of real-world scenarios. In this context, this section of the paper documents the findings of one such study, undertaken at the Property Services Department within a leading retail group in the UK.

The primary objective of the case study was to establish whether the concepts behind the SPICE FM framework are applicable and relevant to a FM provider in the private sector.

5.1 Study methodology

A series of meetings with the management team at the Property Services department gained the necessary commitment to proceed with the study. This paper does not disclose the precise source of process capability findings. This ensures that members of staff can speak openly about their perceptions of the organisation. The confidentiality of assessment data was made clear to all members of staff that participated in the study.

As already mentioned, this study aimed to assess the capability of the management processes that support the implementation of the Department’s business strategy. Below is a list of the key assessment activities undertaken:

- **Departmental management interviews** - The objective of the interviews was to understand: What management views as the critical issues facing the department; What process capability management believes the department has; How policies and procedures are defined; How communication flows through the organisation; and How process improvement fits into the department’s vision.

- **Employee interviews** - A representative cross-section of employees were chosen to participate in semi-structured interviews, ensuring an unbiased view of the organisation.
- **Document review** - The research team reviewed items of documentation that employees referred to in interviews. This was to establish whether such documents actually exist, what form they take and their availability to staff.

A detailed description of the SPICE FM process maturity model is already given. The key processes considered within this study were the SPICE FM Level 2 key processes: - Service requirement management; Service planning; Service performance monitoring; Supplier and contractor management; Risk management (including health and safety); and Service co-ordination. These key processes were assessed against the process enablers, as already described in section 3 above. SPICE FM process maturity model identifies five process enablers, which are types of thinking or activities that are pre-conditions for implementing the process. Process enablers focus on the results that can be expected from a key process. This is a forward-looking approach, which indicates an organisation has process capability before a process takes place.

6. Case Study findings

This section refers specifically to the results and outcomes from using the SPICE FM model within the Property Service department. An important objective of the case study has been to understand how the criteria identified in the SPICE FM process model relate to the department. Using the results of the assessment undertaken during the study, this section highlights some of the areas in which the department satisfies or fails to satisfy the key criteria of the key processes and their enablers.

6.1 Service requirement management

Effective management of service requirements identifies the needs of the organisation and its users. The service delivery team identifies how many tiers of customers it has and how their requirements differ. The team has a clear sense of priority in term of its customers and the service mixes it offers. Service level agreements and performance standards are developed and continuously reviewed to remain consistent with customer requirements. They are also communicated to all staff involved in service delivery. The process meets the needs of both responsive and preventative maintenance requirements

The integrated helpdesk is used by the department to record requests from individual stores. Specialist support is available to the operators to respond to more complex queries. The Property Management System establishes schedule of compliance (asset registers, PPM plans and performance criteria). The asset register names appropriate specialist contractors – including primary and secondary options where appropriate. A combination of on-the-job training and procedures are used to train operators. The supervisor is in the process of expanding this into a more comprehensive training schedule. The move towards an integrated helpdesk has improved resource efficiency and ensures effective backup is in place for busy

periods. Out of hours provision has also been addressed.

6.2 Service planning

Service planning establishes realistic schedules of work based on customer requirements. Estimates (e.g., resources, maintenance schedules, budgets, purchasing) are prepared for all work to be performed (e.g., scheduled and reactive maintenance). The department has well established systems in place to plan service provision in line with service level agreements. Service level agreements establish clear expenditure guidelines and budgets for individual chains and allow the department to service chains in line with their specific requirements (e.g., the balance between proactive and reactive maintenance). The department has distinct prioritisation levels for jobs that form the basis for establishing target times. The escalation procedure for prioritisation appears well established and understood by staff. The department has distinct prioritisation levels for jobs that form the basis for establishing target times. Costs for maintenance activities are clearly defined based on a schedule of rates for each contractor (including call out rate / hourly rate). Clear guidelines for approval to proceed are in place based on automatic approval mechanisms. Managers have recognised that efficiency savings can be made through a more intensive planning process. This indicates evaluation of the process is taking place.

6.3 Service performance monitoring

Service performance monitoring ensures that services are delivered in a manner that is consistent with the service level agreements and performance standards established with the customer. Feedback is gathered (e.g., from customers and staff) to monitor customer satisfaction levels. Performance measures (e.g., waiting times, error rates, processing times) are reviewed on a regular basis, with the involvement of staff, and corrective action is taken when service delivery deviates significantly from service plans.

Significant efforts have been made to introduce key performance indicators. The department has a wide range of systems in place by which to monitor its performance. Examples include: Financial reports; Weekly reports; Call statistics; Complaints / complements log; Job Checking report; Quality audits; Work record sheet auditing; Invoice auditing; and Year on year profiles. However, there is little evidence that the new reports and key performance indicators are being linked to the needs of the core business. For example, the department appears keen to demonstrate the importance of the FM function to the core business, emphasising the cost of maintenance and the need for proactive maintenance. However indicators are not being developed to address these issues. Although some feedback is gathered at a branch level, it is sporadic and probably inadequate to provide an accurate reflection of customer satisfaction. Tools such as post project reviews and more comprehensive questionnaires were suggested by staff to address this. Despite the similarity between the chains served by the department there appears to be little or no internal benchmarking. Such systems could be used to demonstrate the effectiveness of a chain's

property management strategy relative to others in the group.

It is clear that the department has spent significant resources identifying and implementing improvements to its monitoring and reporting structure and these appear to be largely successful. However two areas were identified by this assessment for improvement: more extensive monitoring of individual maintenance tasks (at a branch level) is required to ensure quality standards are being met. Additional resources may be required to address this issue satisfactorily; and although key performance indicators have been fundamental to the changes in reporting, their relationship to the core business appear unclear.

6.4 Supplier management

This key process involves the selection of suitable suppliers and contractors. Service level agreements and performance standards are established and their performance is continuously reviewed.

Due to the nature of the departments operations (i.e., subcontracting of work to external supplies), there are significant overlaps with comments in other key processes. The retail group operates a strict buying policy that is well communicated and understood by staff. The department has a clear objective to streamline the current supplier base in an attempt to improve services and gain ownership. Related to this is also a desire to move towards total FM - supply, install and maintain. This objective is understood by staff within the department. Service level agreements are in place with the supplier base creating performance standards and establishing levels of cover within different contracts. However monitoring of suppliers is simplistic (e.g., random checks, clerk of works, named and shamed, periodic review meetings) and is felt by staff to be ineffective. There is little data available to establish whether performance standards are being achieved. The department has expressed a desire to introduce more objective incentive targets in the future that will make the service level agreements more comprehensive. The department has recognised that the performance of suppliers reflects on its own image within the Group and is taking steps to address these weaknesses. At the time of assessment, there was evidence of significant shortcomings in the systems for selecting and monitoring the department's supplier base. However it is clear that the department has recognised these problems and is in the process of identifying and implementing steps to resolve them

6.5 Risk Management

Risk management involves identifying and evaluating risks so that action can be taken, either to reduce the likelihood of an event occurring or to limit the consequences should that event occur. Risks are identified in all areas of the business (e.g., health and safety, environmental, supply breakdown, property, financial performance). Members of staff are actively involved in identifying risks and taking steps to prevent risks becoming a reality.

At the retail department, formal risk management is limited to health and safety issues. An external consultant is responsible for the majority of health and safety issues. Consequently it was not feasible to examine the process in detail during the case study. However, the department has a clear reporting structure and systems in place for recording and monitoring health and safety issues. The procedures developed to manage unplanned events suggest some awareness of broader risk management issues within the department.

It lacks a clear directive from senior management to manage broader risk issues. The majority of staff are unfamiliar with the concept of risk management and are therefore not in a position to play an active role in the management of the Group's risk – in particular, an awareness of how their job might impact the core business. Consequently the department's employees are unaware of risk management and have received no specific training. Some escalation procedures are in place to manage the unplanned event. Employees feel that the Group is committed to managing health and safety and in particular, recognise its importance to the core business. The department employs an external health and safety consultant "Safety Works" to investigate health and safety problems. The consultant issues questionnaires and carries out audits to ensure method statements, risk assessments, policies and training are in place. There is a well defined accident reporting structure in place. However the role of the health and safety manager within the department is poorly defined, lacking clear scope and objectives. The significance of the department's operations to the core business suggests that this is an important issue to address in the future.

6.6 Service co-ordination

Service co-ordination draws on the experience of other service teams, suppliers and customers to meet customer requirements effectively. Co-ordination between these three groups ensures that disruption to the core business is minimised. Representatives with responsibility for co-ordination are appointed, and co-ordination methods are agreed.

The restructuring of the department to offer a cross chain service has improved integration and communication internally. The relationship between the department and individual stores is remote due to the work being performed by external suppliers. The department has little insight into the effectiveness of the suppliers' co-ordination with individual stores due to the poor monitoring of individual jobs. The 'Vision' process is actively bringing together different sections of the department to improve service delivery. By addressing operational management and reporting issues collectively, this should aid process integration. However, the membership of the Vision group remains small. Some of the department's systems have not been effectively integrated to reduce duplication.

It is clear that integration and co-ordination have improved in recent months as a result of the significant changes taking place within the department. The main weakness concerns the relationship between the department and the customer, due to the poor supplier monitoring and communications currently being utilised. This issue should at least in part be addressed

by changes to supplier management monitoring process.

6.7 Process Evaluation and Verification

Evaluation involves basic internal process evaluation and reviews. These internal evaluations are used to help control and improve processes. During the early stages of maturity, this translates into efforts by the team to improve existing processes. The focus here is on the project team's internal improvement efforts. A verification procedure checks that activities are performed in compliance with the agreed process. Adopting verification as a process enabler in turn emphasises the need for independent verification by management and quality assurance. The focus is on external verification of processes.

The department is progressing with a significant change programme, supported by a dedicated resource to identify and drive improvements. A comprehensive "joint action plan" is in place to continually evaluate its operations, identify improvement areas and establish actions based on those requirements. Each action is assigned to specific staff and has clear target implementation dates. The "joint action plan" has a relatively small membership base, making it difficult for some employees to have an input into the process. The quality of communication to those employees has been variable. Consequently, everyone is aware that changes are taking place but the effect of those changes is sometimes not apparent. The value added to the core business through the change programme is not clear. The reporting systems being established within the department provide a checkpoint to ensure that the correct process is being followed. Some formal auditing of suppliers takes place, particularly in relation to health and safety issues. Procedures within the department tend to be informal rather than documented. To ensure that new reporting systems and processes are understood and adopted by staff, it may be necessary to formalise them, including the identification of clear responsibilities and duties. It is clear from the assessment that the department has established a suitable infrastructure to continuously review and improve its key management processes. Verification is also being addressed by this action, through the introduction of a new reporting structure.

7. Summary of process capability assessment

Figure 2: The department's process capability matrix

| | | Level 2 Key Processes | | | | | | |
|------------------|--------------|-------------------------|------------------|------------------------|----------------------------|------------------------|-----------------|-----------------------|
| | | Service Requirement Mgt | Service Planning | Performance Monitoring | Supplier & Contractor Mgt. | Health and Safety Mgt. | Risk Management | Service Co-ordination |
| Process Enablers | Commitment | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | Ability | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | Activities | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | Evaluation | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | Verification | ■ | ■ | ■ | ■ | ■ | ■ | ■ |

Key: Satisfied ■ Partially Satisfied ■ Not Satisfied ■

During the period of the SPICE FM study, the department was part way through a significant change programme aimed at improving the department's processes and reporting systems.

The change programme complicates the findings due to the inevitable collection of contradictory evidence – a before and after scenario. The SPICE FM assessment emphasises the importance of establishing the necessary infrastructure to support and improve processes over time and it is clear from the assessment that the department has allocated significant resources and introduced new systems that address this issue directly. Although the department still has some weaknesses to address, the necessary infrastructure is being put in place to identify and correct these issues in the future. Indeed, because of this infrastructure, many of the weaknesses raised in this report may already have been identified by senior management. Figure 2 is an attempt to summarise the department's process capability against the SPICE FM model. The matrix highlights the mature nature of its processes following the change programme. The main concern surrounding the change programme is the lack of clear strategic direction. Consequently, despite the efforts and likely performance gains the benefits to the core business are likely to remain unclear.

References

[1] Ould (1995). *Business Processes: Modelling and Analysis for Re-engineering and Improvement*. Wiley.

[2]. Paulk, M., Weber, C., Curtis, B. and Chrissis, M. (1994). *The Capability Maturity Model: Guidelines for Improving the Software Process*. Addison-Wesley, Massachusetts.

[3] Sarshar, M., Haigh, R., Finnemore, M., Aouad, G., Barrett, D., Baldry, D. and Sexton, M., (2000) 'SPICE: A business process diagnostics tool for construction projects'. *Engineering, Construction and Architectural Management*, Vol 7, No 3, pp241-250.