DIVISION OF COMPUTER SCIENCE

B-CCD: A framework to enable SMEs to make Business-Critical Computing Decisions

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Abstract

This paper reports the first cycle of action research to develop the B•CCD (Business-Critical Computing Decisions) framework which has been designed to support SMEs in developing IS/IT strategies. The framework combines ideas from Process Quality Management, IS/IT strategy and Business Process Re-engineering. A brief description of the first pilot use of B•CCD with a small manufacturing company including a summary evaluation is used to discuss future developments to B•CCD. The structure of the framework is discussed with reference to the underlying theoretical concepts and is evaluated against recent classification frameworks.

Introduction

B•CCD has been specifically developed for small and medium-sized enterprises (SMEs) to enable the development of an IS/IT strategy which is driven by the business imperatives of the enterprise. The framework, described in more detail later, requires a team culture in which external facilitators using a structured framework can assist the enterprise's strategy development team to make critical computing decisions and define their own IS/IT strategic intent and action plans. The B•CCD framework has now been piloted in an SME providing the first cycle of action research in the new framework's evolution.

SMEs frequently suffer from a lack of expertise in IS/IT and poor perception of the capabilities and uses of IS/IT. In order to maximise the benefit from IS/IT investment, which in an SME is often driven by technology, there is a need for some form of IS/IT strategy. However they often lack the financial, human and information resources to undertake the analyses needed to develop a IS/IT strategy.

The size and flexibility of SMEs means that they should, and do, change orientation rapidly, Consequently they require methods or frameworks that are flexible to the organisation's needs and are quick to provide a 'do able' outcome, rather than the traditional heavy weight approaches to IS/IT strategy development (Fidler and Rogerson 1996). Bergeron and Raymond (1992) stress that the involvement of a consultant is often appropriate in these circumstances.

The specific problems of IS/IT strategy development within SMEs were considered during the development of the B•CCD framework. The first part of this paper describes the development of the framework and includes an evaluation of the pilot. The second part of the paper evaluates the B•CCD framework.

Over the past ten years a number of methods and frameworks have been researched to help organisations define an IS/IT strategy (Fidler and Rogerson 1996, Flynn and Goleniewska 1993). Flynn and Goleniewska use Earl's criteria (1989) to compare the breadth of the IS/IT strategy development process and the deliverables output for five different methods. B•CCD is evaluated against these criteria.

Fidler and Rogerson (1994a and 1994b), propose an approach to classifying, frameworks and methods, organisations and their strategy development staff, to support identifying the 'best fit' framework or method. A parallel is seen here with the development of the NIMSAD framework for system development (Jayaratna 1994). Fidler and Rogerson's approach is a two dimensional classification framework and B•CCD is evaluated against the structural and applications criteria they identify.

Background to B•CCD

PQM (Hardaker and Ward 1987) was developed in the mid 80s and has been used by IBM UK consultants with a number of large organisations globally to help teams, specifically management teams, to develop their business strategy. The identification of an IS/IT applications portfolio was seen as an important by-product which would be developed after the formal PQM project. During its use PQM continued to evolve, but the changes were not formally presented.

UPQM (Hinton, Tagg and Bennett 1995) took the basic principles and concepts of PQM and suggested tools, techniques and process changes which would support the development of an IS/IT strategy and make the process more applicable to SMEs. UPQM was designed to address the factors identified for successful IS/IT strategy development (Flynn and Goleniewska 1993, Bennett and Hinton 1994, Fidler and Rogerson 1996). It was felt that a facilitated approach would be needed to aid SMEs in the development of both their business strategy and their IS/IT strategy, though the type of facilitation, expert, doctor, or process (Schein 1990), would vary depending on the company's internal skills and resources. The framework incorporates the top-down, the bottom-up and the inside-out views as proposed in Earl's Multiple Methodology (Earl, 1989). Although not specified in great detail the concept of business process reengineering (BPR) was incorporated into the framework through the use of tools such as Porter's value chain analysis (Porter 1985).

From the IS/IT strategy perspective, the developers of UPQM wished to move away from the concept of an IS/IT strategy as the prioritisation of an applications portfolio. This was seen as just one aspect of the IS/IT strategy. In UPQM a strategic intent would be developed for the organisation which would include issues of information management (providing the support services, resourcing IS/IT, training and financial issues), information technology (hardware, systems and network architecture and standards) and information systems (data management and applications development).

In August 1995 the UPQM team joined with one of the originators of PQM and a number of his colleagues. This link, between consultants from IBM with experiences of using PQM in a large number of organisations world wide combined academic ideas and consultancy expertise. The new framework B•CCD (Business-Critical Computing Decisions) draws upon ideas from Process Quality Management (Ward 1990, Tagg 1994a, Hinton et al 1995), IS/IT strategy (Bennett and Hinton 1994, Tagg 1994b) and Business Process Re-engineering (Weerakkody et al 1995).

B•CCD Framework

Overview of B•CCD

The framework delivers the key requirements for improving the overall performance of the enterprise and an understanding of the value and relevance of the current uses of IS/IT. It identifies the principal opportunities and priorities for investment in IS/IT and action plans for implementation.

B•CCD has three phases centred around a two-day residential workshop involving the sponsor usually the MD and the senior management team. The approach is a combination of process-based consultancy with the facilitator helping the management team to clarify its thinking about the enterprise, and expert-based consultancy with the facilitator advising on IS/IT issues and opportunities. B•CCD is centred around the compilation of a number of documents which feed into one another and provide the main analysis tools. The framework also provide the strategy developers with a toolbox of techniques and tools to use as appropriate. The phases of B•CCD are discussed in more detail below.

Pre-workshop Activities

Prior to the workshop, activities are undertaken by the facilitators in conjunction with individual members of the team and others in the enterprise to gather information which provides a basis for the workshop. This includes a technical audit of current IS/IT provision. It is important to ensure that the problems to be addressed are appropriate for the use of B•CCD and that these problems are recognised by executive management. The executive management must accept the need to address business issues before technology.

Workshop Activities

The core of B•CCD is a facilitated, two day, residential workshop attended by the whole management team which produces an IS/IT strategic intent and action plans. The process uses information gathered by the facilitator prior to the workshop, is intensive and iterative and produces plans which are owned by the team.

The vision and statement of direction are first established by setting boundaries for the enterprise and assessing where the enterprise wants to be in the future drawing upon past lessons and future scenarios. The critical success factors (CSFs) for the enterprise are identified. The facilitator then works with the management team to agree the business processes using the value chain classification. Each business process is evaluated to assess its quality and importance to the enterprise. This information is combined with resource considerations to identify the most critical processes where improvement is required if CSFs are to be managed successfully (and hence the vision achieved).

Business process re-engineering opportunities are considered by reviewing the business processes, IS/IT opportunities and the IS/IT technical audit. The results of the IS/IT technical audit are combined with an assessment of the IS/IT support provided to business processes and with IS/IT 'wish lists' to identify priorities for IS/IT development and an IS/IT strategic intent. The emphasis is on providing IS/IT support to the most critical processes. Pragmatic, short term action plans are written which focus upon improving the most critical processes. The plans define a series of quality improvement projects arising from considerations of business process re-engineering, from the IS/IT strategic intent and from IS/IT development priorities.

The facilitator works with the team to ensure that responsibilities are assigned to critical business processes and to items in the action plans. The team defines quantifiable success measures for the vision and statement of direction. These will be used in rolling reviews of IS/IT projects to ensure that they continue to relate to the high-level objectives of the enterprise. Procedures are agreed for communicating B•CCD outputs to the enterprise and possibly to third parties.

Post-workshop Activities

Regular, high level quarterly meetings monitor the progress of items in the action plans by evaluating inputs from regular review meetings conducted by project teams. The quarterly reviews also use the documents produced in the B•CCD workshop as a basis for ensuring that the IS/IT strategic intent and development priorities continue to be aligned with the objectives of the enterprise.

Pilot Summary

The pilot study involved a small manufacturing company undertaking work mainly for the defence industry. The company is part of an international group and has been formed over the past two years by the integration of a number of separate manufacturing companies from the group. Employee numbers have been reduced since the merger from approximately 600 to 160 and all staff are now all based on one site located just outside London.

The pilot was undertaken as a fee earning consultancy project and the initial information dissemination and agreement of the appropriateness of the framework to the situation was, in effect, part of a tendering procedure. The total elapsed time for the project from winning the tender to delivering the final report was two months.

In parallel, as part of the action research and in order to evaluate both the process and the outcomes of the use of B•CCD, short questionnaires were sent out at the start of the pilot to all those involved in the workshop and semi-structured interviews, lasting about one hour, were held with all members of the team after the workshop. The completed questionnaires were returned to members of the B•CCD research team who were not involved in the facilitation and the same subgroup undertook and analysed the interviews. This research information will be fed back together with the practical lessons learnt by the facilitators into the next version of B•CCD.

The Managing Director was the project sponsor and the team members included all the functional heads of departments and a senior member of staff with a strong interest in IS/IT. The team had been working together for the past two years and some members of the team had had previous experience of developing a business strategy. These members of the team were able to bring their preliminary ideas to the B•CCD workshop. There was little IS/IT support provided or control exercised by the group on the individual companies and there was no specified IS/IT director or manager co-ordinating IS/IT developments in the company.

Prior to the workshop, in addition to the team members, eleven other members of staff were interviewed and some people were interviewed more than once. Draft documentation was distributed to all members of the team prior to the workshops. The pre-workshop interviews were extremely effective, enabling the facilitators to establish a working relationship with all the members of the team and to collate a considerable amount of highly relevant information. The 'triple decker' interviews (executives, managers and professionals) had two effects, the first to raise the profile of B•CCD workshop through out the organisation and secondly to enable detailed information with cross checks and balances to be collated.

The workshop, facilitated by members of the B•CCD research team, took place over two days in a local hotel and was seen to have been interactive, enjoyable and worthwhile. Day one of the workshop, covering basically the same tasks as a normal two day PQM workshop, went well. Day two of the workshop addressed a number of new areas defined in the B•CCD framework more specifically related to the IS/IT strategic intent and action plans. A final report was sent to the team members within 10 days of the workshop.

The company has yet to arrange the formal follow up meeting as specified in the framework and agreed at the workshop, but the follow up semi structured interviews have taken place and a more formal analysis of the process and outcomes will be reported elsewhere.

Evaluation of the B•CCD framework

The business led approach to the formulation of an IS/IT strategic intent fitted with the pilot company's view of their needs and the company had a number of business imperatives that B•CCD could address. The recent restructuring, downsizing and market changes had resulted in the need for a well structured business strategy. This would be facilitated by the implementation of business processes coupled with a high leverage use of IS/IT to drive competitiveness and efficiency. The B•CCD process did help identify the key requirements for improving the overall performance of the organisation.

Information, relating to the current use of IS/IT, gathered by the facilitators prior to the workshop provided a clear understanding of the value and relevance of the existing IS/IT and this information together with the wish lists and business quality analysis of the existing systems provided a means of identifying the principle opportunities and priorities for investment in IS/IT, though it was realised that the prioritisation of projects for investment is most critical. A SME cannot undertake too many projects at one time.

At the end of the workshop the team did commit to action plans for implementation and each plan had a clearly identified project sponsor. In retrospect, these action plans needed to have had defined time frames with review dates identified.

Overall some very promising lessons were learnt and many of the tools and techniques used proved to be valuable support. The selection of B•CCD related tools and techniques to be used in the pilot reflected the organisation's existing experience and needs. Additionally a number of new tools and checklists evolved during the project. The lessons learnt and the new ideas and tools generated, will be fed back into the framework and the B•CCD team will need to review and re-evaluate the process, particularly day two of the workshop. The team worked well together to achieve consensus and the facilitated approach enables the MD to put forward his own views as a member of the team. B•CCD was an appropriate framework for this organisation.

The pilot reinforced the premise that strategy development is not just about following a formal method or framework but must involve creativity, analysis and operational knowledge (Fidler and Rogerson 1996).

B•CCD and SMEs

Whilst the B•CCD team will evaluate the framework with a wider range of SMEs, this first pilot project is representative enough to make some generalisations. The organisation was small and while there were many instances of expertise and effective use of IS/IT in functional areas, there was no overall IS/IT leadership or perception of the capabilities of IS/IT. This particular organisation had already spent some time developing a business strategy, though the time spent reviewing and developing this area was perceived as worthwhile. While finance as such did not seemed to be the major constraint, the limited availability of IS/IT skilled resource was a major problem and thus while the facilitated approach supported the development of an agreed IS/IT strategic intent and action plans, the lack of skilled resource to follow these through is an identified problem. However the management team did own the strategy and have now agreed, and are committed to, a strategic intent and a set of action plans which have the flexibility required by an SME. The flexibility of the B•CCD framework and the ability to select tools and techniques appropriate to the organisation enabled the strengths and weaknesses of the organisation to accommodated.

The time efficient, interview and workshop approach seemed to work well with an SME, where the team is relatively small and centrally located. The culture of the organisation was appropriate to the use of B•CCD. In a large global organisation this approach may not be feasible.

Having the right facilitators to make the process consultation approach work is clearly going to be a major factor in the future, particularly for SMEs. A wide range of technical, analytical, interviewing, business and other skills are required. In general it is anticipated that the framework will need two facilitators in order to ensure that the range of skills is met and that the workshop runs smoothly and no ideas get lost.

Theoretical Evaluations

Earl (1989) identifies nine criteria or considerations to ensure a successful outcome when undertaking Strategic Information Systems Planning (SISP) or an IS/IT strategy development. These are listed in appendix 1, table 1 together with an evaluation of how B•CCD meets these criteria. It can be seen from the table that the main limitation of the framework maybe the lack of user involvement, though during the pilot it was found necessary to interview more members of staff from the organisation than had first been anticipated. Ways of communicating the ideas generated from the workshop to the rest of the organisation was also seen as an important part of the process.

Appendix 1, table 2, shows B•CCD evaluated against Earl's suggested outputs of the process. It can be seen that the framework meets nearly all these criteria, only information architecture is not covered, though the project plans agreed are not as detailed as in some other methods. The coverage of B•CCD is more complete than the other methods evaluated by Flynn and Goleniewska (1993).

In appendix 2, B•CCD is evaluated using Fidler and Rogerson's (1994a and 1994b) structural and application complexity criteria for method or framework classification, generating a complexity value which can also be used to compare the framework with other methods (tables 1 and 2 respectively). To classify a method or framework, a structural complexity value is computed from a consideration of the use of method itself, which is independent of context. An application complexity value is computed from a consideration of the participants and background context. In each case a number of relevant and interrelated criteria are given values which are then totalled.

These values are plotted on a complexity grid (Fidler and Rogerson 1994a and 1994b). The grid is a two dimensional matrix of structural complexity against application complexity. Each quadrant identifies the business and IS/IT expertise needed to use the framework with the particular organisation. The B•CCD values for the pilot of 18/14 (structural complexity/application complexity), appear on the complexity grid in the bottom left hand 'easy to use' quadrant, but near enough to the other quadrants to indicate the need for higher levels of both business and IS expertise. This is in fact in line with what the researchers would expect given that the framework has been developed specifically for SMEs using both process and expert facilitators. B•CCD is similar to the majority of methods and frameworks evaluated by Fidler and Rogerson, that is, just below the mid-point line of structural complexity, indicating some IS input in all situations.

Conclusion

The first cycle of action research using B•CCD established that it provided a structured framework within which the B•CCD team's facilitation, business and IS/IT skills could be used to help an executive team in a SME produce an IS/IT strategic intent and pragmatic, do-able action plans in a quick, flexible and inexpensive way. It focused on the essential need for the IS/IT strategy to contribute to critical business requirements as well as fully exploiting IS/IT opportunities in a creative way to streamline and enhance operations and the SME's own IS/IT expertise.

B•CCD has enhanced the well proven method PQM by incorporating the latest thinking on IS/IT Strategy and Business Process Re-engineering to provide a simple and powerful way to develop IS/IT strategy based firmly on business requirements for small and medium sized enterprises. The complexity of the process adopted can be adapted to meet the specific needs of the organisation.

B•CCD version 0, satisfies Earl's (1989) criteria for developing a successful IS/IT strategy, both in terms of the process and outputs generated. On Fidler and Rogerson's (1994a and 1994b) complexity grid B•CCD evaluates as easy to use.

The pilot was monitored throughout and feedback incorporated into the process. Subsequent to this cycle the framework is being reviewed and the experience gained will lead to plans for future developments which may include additional tools and techniques and modifications to the process. These enhancements to B•CCD will aim to make the approach as effective and as complex as organisational needs dictate, whilst at the same time taking care to ensure that the action research approach does not become 'mere action' (Checkland 1991).

References

Bennett, J and Hinton, P (1994) 'Developing an Information Systems Strategy', in: ISTIP '94, Sunningdale April

Bergerin F and Raymond L (1992), Planning of information systems to gain a competitive edge, Journal of Small Business Management, Vol 30 No1 pp 21-26

Checkland P (1991) From Framework through Experience to Learning: the essential nature of Action Research, Information Systems Research, Contemporary Approaches and Emergent Traditions, H E Nissen H K Klein and R Hirscheim (Editors) Elsevier Science Publishes B V (North Holland)

Earl M J (1989) Management Strategies for Information Technology, Prentice Hall, London

Fidler, C. and Rogerson, S. (1994a), Strategic Information Systems Planning: its adoption and use, Information Management and Computer Security, Vol 2 No 1 PP 12-17

Fidler, C. and Rogerson, S. (1994b) Choosing the right tools for the job: classifying SISP methodologies, Association of Management's 12 Annual Conference, Dallas, USA

Fidler, C. and Rogerson, S. (1996) Strategic Management Support Systems, London: Pitman Publishing

Flynn D J and Goleniewska Eva, (1993) A survey of the use of strategic information systems planning approaches in UK organisations, Journal of Strategic information Systems, December 2(4)

Hardaker M and Ward B K, (1987) Getting Things Done: how to make a team work, Harvard Business Review Nov-Dec pp 112-117

Hinton, P., Tagg, C. and Bennett, J. (1995) 'UPQM - An Update of PQM for developing IS/IT Strategy in Small Businesses' in proceedings of second European Conference of Information Technology Investment Evaluation, Henley, June

Jayaratna N, (1994) Understanding and Evaluating Methodologies, Nimsad, A Systemic Framework, Information Systems, Management and Strategy Series, McGraw Hill Book Company

Porter M E, (1985), Competitive Advantage: Creating and Sustaining Superior Performance, The Free Press, New York

Schein Edgar H (1990) A General Philosophy of Helping: Process Consultation, Sloan Management Review 57 Spring

Staples, G. and Stapleton, J. (eds) Software Quality Management II Vol 1: Managing Quality Systems, Southampton: Computational Mechanics Publications

Tagg, C. (1994a) 'Process Quality Management: A case study of its use in determining the IT strategy for a small business' in: Ross, M., Brebbia, C.A., Tagg C (1994b) 'IS/IT needs strategic thinking' in proceedings BIT'94, Manchester, November

Weerakkody, V., Tagg, C. and Bennett, J. (1995) 'Bridging the Gap Between Business Process Re-engineering and Information Systems: Identifying Key Issues' in proceedings BIT'95, Manchester, November

Appendix 1

Table 1: Breadth of Process Detail of a SISP Approach

Consider organisational goals and strategies	yes
Assess current set of IS	yes
Identify information needs	yes
Evaluate competitive environment	yes
Assess external technical environment	yes
Agree system priorities	yes
Provide individual project planning	yes
Involve users	only in initial information gathering
Gain top management support/commitment	yes

Table 2: Breadth of Output of a SISP Approach

Organisational objectives and activities	yes
Information architecture	no
Applications portfolio	yes
Portfolio priorities	yes
IS management strategy	yes
IT strategy	yes
Project plans	outline

Appendix 2 (For further details about the criteria see Fidler and Rogerson 1996 p 271)

Table 1: Structural Complexity Values for B•CCD

Criteria		**Complexity Value** (1 low to 5 high)
S1 Ability to adapt	change operation	3
S2 No of ways to interrelate	several	3
S3 Rule prescriptiveness	some freedom	3
S4 No. of techniques	>=8	4
S5 Constituency of methodology constituency of each technique constituency of each tool in a technique		3
S6 Ambiguity of terminology	clear	2
Total For Structural Complexity Value		**18**

Table 2: Application Complexity Values for B-CCD

Criteria		**Complexity Value** (1 low to 5 high)
A1 Evolution rate	gradual	3
A2 Objectives of participants	unitary to pluralistic	2
A3 Planning policy	formalised	2
A4 No. of participants	<10	2
A5 Experience of SISP	some	3
A6 Comprehension of participants	in outline	2
Total For Applications Complexity Value		**14**