STRATEGIC INFORMATION SYSTEMS ALIGNMENT
A Decision Support Application for the Internet Era

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Abstract Strategic information systems planning, SISP, methods have proven organisationally complex to utilise, despite 40 years of research and evolution of Information Systems, IS, in the organisational context. The diverse nature of organisational strategy and environmental factors have been mooted as primary causes. On one hand, confusion exists in the literature due to divergent, deficient definitions of SISP. On the other, a lack of distinction exists between SISP as a planning process, and the broader alignment of organisational direction with the IS capability that provides the context for sustainable IS intellectual and cultural integration. Consequently, no methods or models for alignment of IS and organisational activities exist that have both validity in the literature and sustainability in practice. HISSOM (Holistic Information Systems Strategy for Organisational Management) is a practical, holistic model that co-ordinates and facilitates cohesive alignment of organisational needs and the IS capability required to meet those needs, at (1) stakeholder; (2) feedback metrics; (3) strategy and change management; and (4) organisational culture and capability levels. HISSOM was initially developed as a logical extension of the IS-alignment literature, and has been validated by action research in several significant studies in different industries, markets and organisational settings. The HISSOM model has been revised in the light of these studies, and a practical, Web-based decision support application, the HISSOM Decision Support Advisor, HDSA, is now under development, to promote wider use of the model and obtain evolutionary feedback from the user community. A synthesis of the development of HISSOM and work on designing the HDSA architecture is described, together with the impact of this research on extending the field of SISP and IS-alignment.

1 INTRODUCTION

Business-IS alignment seeks to align Information Systems Strategy, **ISS**, and Information Systems, **IS**, capabilities with organisational strategy and needs, historically through strategic information systems planning, **SISP**, approaches. Despite research stretching back 40 years, and an unfounded but widespread belief by researchers and practitioners that this area has been comprehensively addressed, no approach exists that successfully achieves this alignment.

Recent research recognises the need to reconsider the field of SISP, and to respect the wider aspects of IS-alignment, including social and behavioural (McGrath et al, 1998)(Reich and Benbasat, 1996, 2000), human relational (Pyburn, 1983), participatory (Hatten and Hatten, 1997), cultural (Chan et al, 1997) and stakeholder (Lanc and MacKinnon, 2001, 2003, 2004a) aspects that influence organisational activity.

A dearth of significant empirical evidence into IS-alignment remains evident, questioning the completeness of SISP as a driver of IS-alignment (Sabherwal and King, 1995)(Teo and King, 1996)(Luftman, 2000). Conflict between those supporting formal planning methodologies (Bergeron et al, 1991), and those that do not (McFarlan, 1971)(Runge, 1988)(King et al, 1989), is evident in research (Earl, 1989, 1990, 1993)(Vitale

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et al, 1986)(Sabherwal and King, 1995), supporting the hypothesis that SISP is incomplete.

The central tenet of SISP as an IS-alignment enabler has been directly challenged by researchers (e.g. Lederer and Mendelow, 1989;Lederer and Sethi, 1992;Mentzas, 1997), and commercial surveys (e.g. Computer Technology Research Corporation, 1994) supporting the existence of an undefined phenomenon of IS-alignment that transcends the confines of SISP, towards a more holistic strategic IS-alignment, **SISA**, phenomenon, comprising the structural, social, behavioural, cultural and political aspects of organisational endeavour (Lanc and MacKinnon, 2004c).

This wider alignment phenomenon is more critical to the Internet era, which has introduced direct, global organisational-consumer contact through Web-based IS (Lanc and MacKinnon, 2003)(Porter, 2001)(Butler Group, 1997) hitherto possible only through traditional EDI (Galliers, 1999)(Ward and Peppard, 2002). To facilitate strategic alignment beyond the historic limitations of SISP, SISA must address IS's appropriate organisational standing (Feld and Stoddard, 2004), rectify the historic absence of top management representation and poor credibility (Benjamin et al, 1984)(Earl and Feeny, 1994), IS-organisational performance alignment, and improved education and interaction of both business and IS management (Teo and King, 1997).

HISSOM (Holistic Information Systems Strategy for Organisational Management) was developed to address the limitations of SISP, and to bring life to the concept of SISA, adopting a holistic, multi-dimensional view of IS-organisational alignment. HISSOM is therefore a logical but important extension of the literature.

This paper describes the development of HISSOM from initial concept, validated through extensive analysis of the literature and significant ethnographic action research studies.

It defines the concept of SISA, and a new definition of SISP, fit for the Internet era, differentiating the two. Finally, the HISSOM Decision Support Advisor, HDSA, catalysing SISA and SISP into practical use, is described.

2 HISSOM BACKGROUND

2.1 The HISSOM model

HISSOM addresses the limitations of IS-organisational alignment evidenced in the literature. It facilitates practical alignment of the IS needs and capabilities of an organisation, through combining rational-analytical approaches of the past with structural, cultural, social and behavioural aspects. Importantly, HISSOM integrates insight, feedback and control mechanisms, thereby aligning metrics for targeting and monitoring delivery. It does this from five key organisational perspectives, giving unique insight into organisational activity systems:

- The stakeholder perspective;
- The organisational management perspective;
- The business emphasis perspective;
- The IS strategy perspective; and
- The baseline capability perspective.

HISSOM also recognises (1) the organisation's external context, or *Weltanschauung* (Avison & Fitzgerald, 1995); (2) the perspectives of external stakeholders, recognised as often ignored (Ward and Peppard, 2002), that influence organisational behaviour; and (3) the importance of continuous improvement methods again often ignored (Galliers, 1991,1999) (Porter, 1996, 2001).

2.2 Application of HISSOM

The initial HISSOM model was developed in 2000 (Lanc & MacKinnon, 2000, 2001). HISSOM was then applied to four diverse real-world settings:

- Europe's largest bancassurance organisation created by merger of two mature financial services organisations (Lanc & MacKinnon, 2004a). One author was the director responsible for the integration and new, IS-enabled strategy of the business;
- A US Internet start-up providing payment processing services for Web-based merchants (Lanc & MacKinnon, 2003). One author was the Chief Operating Officer, responsible for the IS-led strategy for the organisation;
- The UK's largest integrated Cards Business, and its analytics-driven strategy. One author was the strategy and development director of the business; and
- The UK Chip and PIN rollout, the largest financial services change in the UK since decimalisation. One author was a pivotal member of the UK Steering Group for the rollout, representing the largest infrastructure payments participant.

The original HISSOM conceptual model was enhanced in light of action research results, and the concept of SISA developed, before being converted into a requirements specification for the development of the HDSA. It must be emphasised that the action research performed was extremely

substantive in nature, influencing both the organisational and IS strategies for these settings, with one of the authors occupying a senior role in each of the organisations involved for the duration of the process.

2.2 SISA and SISP: Essential components of alignment

Strategic IS alignment (SISA) has been the subject of much work over the last 5 years by the authors (Lanc and MacKinnon, 2001, 2003, 2004a, 2004b). Based upon practitioner experience and IS strategy literature from the academic, practitioner, organisational capability, business management, and commercial developer/consultant communities, HISSOM was developed and applied, initially based upon extending the concept of SISP, in several ethnographic studies in the UK and US markets.

The evolution of HISSOM from a limited SISP to a more holistic SISA approach entailed consideration of 7 drivers (Appendix A) that impact the decisions and actions of each of the 5 HISSOM perspectives. Each driver represents an organisational "layer" that requires vertical co-ordination to facilitate dynamic equilibrium between organisational needs, capabilities and the insight, feedback and control mechanisms required to direct and monitor action.

Additionally, HISSOM facilitates horizontal alignment of each driver/layer, facilitating a "cross-perspective" evaluation of the degree of alignment of that layer (e.g. assessing the degree of strategy alignment, or performance metrics, across all stakeholders). The vertical and horizontal alignment evaluations enable a holistic approach to be evaluated, across perspective groups and organisational layers, bringing conceptual and practical rigour to the concept of SISA, whilst highlighting its distinction from SISP as follows:

- SISP is concerned with analysis, planning and implementation activities associated with meeting organisational needs and achieving competitive differentiation; and
- SISA is concerned, in addition, with ongoing cultural and behavioural alignment of the IS capability with the wider organisational context. The organisational context (e.g. structure, decision-making style, formality) dictates whether any IS endeavour is ultimately strategic (Sabherwal and King, 1995), a factor supporting the encapsulation of SISP within SISA.

HISSOM's 7 layers are consolidated within "insight, control and feedback," "need" and "capability" classifications, as follows:

- "Insight, control and feedback" layers: external benchmarks, market position and balanced scorecard metrics;
- "Need" layers: organisational objectives, strategy planning, change management and continuous improvement, organisational culture (as an undeveloped need), resource management, training and support; and
- "Organisational capability" layers: culture (as an in situ capability), governance, people, process, data, technology and capital components.

The drivers and limitations/assumptions underpinning SISA and SISP were validated against a broad synthesis of the literature (Lanc and MacKinnon, 2004c), resulting in definitions of SISP and SISA as follows:

SISP is a continuous, organisational analysis and planning activity, involving participation and commitment from all relevant organisational constituents, concerning:

- Identification, assessment, introduction and reorganisation, within organisational limitations, of all IS capabilities required to drive and pursue organisational goals;
- Assessment of internally and externally derived IS innovations, including those from continuous improvement and operational transformation activities, exploited by the organisation for competitive advantage or sustainable benefit; and
- Identification, implementation, management control and feedback of the planned change activities derived from the assessment of IS capabilities and innovations, including non-IS organisational activities and resources.

SISA is a dynamic organisational *behaviour*, involving participation, knowledge sharing, commitment and cultural alignment of organisational management and staff with the IS function, concerning:

- Acceptance of the importance, participation and representation at the appropriate level, of IS as a key, integrated organisational capability;
- Recognition of the need for SISP (as defined) to align dynamically the IS capability with organisational needs and goals;
- Development, management and organisation of the IS capability, including outsourcing and other external relationships, to maintain realistic (that is, affordable), dynamic equilibrium with foreseeable organisational needs; and
- Development and management of appropriate organisational governance and relationships, in pursuit of cohesive, integrated organisational interactions, communication, policies and knowledge development.

Appendix A illustrates in tabular form the latest version of the HISSOM model, incorporating the concepts of SISA and SISP. The remainder of this

paper describes the current state of development of the HISSOM DSA, in terms of workflow design, logical architecture and components.

3 THE HISSOM DSA

3.1 Current stage of development

The HISSOM Decision Support Advisor, HDSA, is under development to provide a support facility for organisational executives and managers involved in the development of IS strategy. Currently, the model is dependent on experience-based evaluation by the authors, or the user having extensive relevant experience in the same area. To improve the model's availability and applicability, the HDSA will be enhanced to provide a step-by-step evaluative model with contextual filtering of output advice on the development of IS strategy for specific organisational situations. Additionally, we intend to evolve the HDSA by capturing empirical information from HISSOM applications within the user community, using this information to enhance and expand the underpinning database and contextual rules engine.

The architecture of the HDSA is based on a classic AI decision support model, utilising a deterministic form-based questionnaire model to capture organisational information and determine advice strategies, combined with a rules-based filtering engine to tailor advice to the particular situation. An underpinning database provides the question and answer elements for the forms, and the individual elements used to compose the output advice stream. To date, a fully configurable forms-based interface has been developed in C# for .NET, with the underpinning database currently an SQL-based relational DBMS. We are in the process of developing the rules engine as a logic-predicate model, realising the features identified from the HISSOM development necessary for the HDSA.

HDSA features arising from our extensive action research, comprise:

- An evaluation of organisational maturity in co-ordinating and managing IS alignment;
- An assessment of the experience, expertise and seniority of IS professionals;
- Identification of the cultural, social and behavioural contexts within which organisational activity and interactions occur;
- An assessment of the organisational governance regime; and
- An evaluation of the influence of the five HISSOM perspective groups, in order to establish the perspective weighting inherent in influencing organisational activity.

The above evaluations facilitate generation of an early hypothesis with regard to expected organisational behaviour. This evaluation helps recognise the organisation's environmental context recognised as largely absent in IS-alignment models (e.g. Avison & Fitzgerald, 1995, Galliers, 1999).

Table 1 illustrates, from action research results, rankings used as proxies for the relative influence of each HISSOM perspective group in each study. The results regarding the influence of these groups upon organisational direction comprised:

- A direct correlation between management tenure and the relative influences of the organisational management and business emphasis perspectives, resulting in greater coherence of direction setting. Conversely, the less established an organisation's management (in structured interaction and operating culture), the more directive its influence in decision-making;
- Strictly controlled organisational contexts drive top-down, hierarchical influences. The Cards Business study typified this relationship by the relative ranking of the external, organisational management, business emphasis and IS strategy perspectives. The immature management environment of the Internet study, displayed a more fragmented relationship;
- The baseline IS capability, representing the influence of the IS function specialists, is generally regarded as a "gatekeeper" in mature or relatively mature settings, regardless of its ability to innovate. This was typified in the Cards Business study, in which its IS capabilities were unsupported by Corporate IS resources. The influence exerted by the Cards IS function was a facet of its specialisation, non-compliant architecture and integration with external solution providers' systems, an anomaly within the larger Group;
- An organisation's proximity to an external event such as a merger, industry initiative or new start-up, positively correlates the relationship between the external stakeholder and organisational management groups;
- The existence of integrated IS Strategy resources positively correlates with a greater level of IS-organisational alignment. The outsourced IS capability of the Internet start-up was not integrated into organisational planning activities. This resulted in poor communication and interaction highlighted historically (Hatten & Hatten, 1997;McGrath et al, 1998), and a lack of cohesion between organisational management, IS executives (IS strategy perspective) and IS function (Baseline IS Capability perspective).

Table 1: Perspective Influence Rankings (1=high)

Perspective Group	UK Bancassurer (Mature)	US Start-up (Immature)	Cards Business (Relatively mature)	Chip & PIN Industry Group (Relatively mature)
External Stakeholder	2	2	1	2
Organisational Management	2	1	2	1
Business Emphasis	1	4	3	1
IS Strategy	2	5	4	2
Baseline IS Capability	2	5	3	2

The relative ranking between the Business Emphasis, IS Strategy and Baseline IS Capability perspectives remained constant in all studies. Significant IS capability and competence existed, in terms of skills, experience and operating processes in each study. However, wider alignment was only visible in the more "mature" organisational contexts, where interaction of organisational management and Business Emphasis perspectives catalysed improved organisational coherence.

The absence of a holistic management interaction culture within the start-up study rendered the best attempts of IS and business management to be more involved of little impact. This mirrored findings that executives should recognise the importance of IS alignment with organisational goals (e.g. Pyburn, 1983;Earl, 1993), and the level of understanding that IS management has of organisational needs (Luftman, 2000;Luftman et al, 1999).

Table 1 summarises the interaction of each perspective based on more detailed underlying analyses from action research (page count restricts publication). For example, the external stakeholder perspective was evaluated using a "Cause & Effect" grid, analysing the interaction and influence of various external stakeholder groups upon the organisation. This directly impacted each external stakeholder perspective layer, in turn driving specific HDSA workflow steps:

- Identifying specific external groups that could realistically influence the organisation;
- Identifying the impact of each external group through the seven HISSOM driver layers;
- Identifying and weighting the relative influence of each group upon the seven layers; and
- Identifying specific activities that an external group, or one of its constituents, can influence or restrict the organisation pursuing.

Decision support analyses based upon the HDSA grid are then generated, based on user judgment of the likelihood of events (using Likert scale forms) and their likely impact over time (i.e. immediate or longer term). The output of this analysis is designed to provide management with an indication of the key external influence groups, the immediacy of their influence, and the organisational aspects of interest to those groups. An outcome is generated by the HDSA that was previously only possible in HISSOM evaluations through experience-based evaluations of the authors. Importantly, the HDSA will ultimately gain feedback from a wider population of users, enriching the range of outcomes currently limited by the authors' experience (and biased by that experience).

The concept of "organisational maturity" of IS-alignment required careful consideration in the HDSA design. Table 2 identifies the organisational maturity matrix, comprising four maturity evaluation classifications derived from experience and practice of the authors, supported by the literature.

Table 2: Organisational Maturity Matrix

Organisational Background	**Organisational Culture**	**Skills /Experience**	**Policies /Governance**
Strategy Focus	Tenure of management	Management experience	Organisational Governance
Dependency on IS	Internal innovation dependency	Non-executive/adviser status	Responsibility for IS
Historic IS investment	Existing IS-organisational alignment	External IS dependencies	Responsibility for Strategy Planning
IS outsource status	Barriers to IS innovation	IS Management Experience	Strategy planning governance
Other capability outsource status	Acquisition v Organic Growth	IS technical competency	Resource planning, training & prioritisation
External influences	IS function size/structure	Functional management IS awareness	IS strategy responsibility
Regulatory influences	Strategy Planning approach		Continuous Improvement approach
	Communications/Education/Interaction		IS Governance
	Integration v devolution/silo regime		IS resource prioritisation
	Risk profile		

Organisational culture and specifically the behavioural interaction of organisational executives impacted all studies. Although experiential learning facilitates adaptation to cultural environments during action research, a complication for the HDSA is consideration of how to help future users evaluate the "organisational psyche" that sets the theme for any organisational change activity. Hence, management tenure, evidence of innovation programmes and IS positioning within the organisation are key maturity attributes. Evaluating IS-organisational alignment history provides insight into organisational behaviour regarding strategy and investment in IS, and whether the IS capability is deemed ancillary or core. The presence of IS skills and competence, and of formal/informal governance over strategic direction and IS management, also support an overall assessment of organisational maturity.

Each HDSA element drives detailed questions sets which ultimately drive a "maturity" metric, categorised as follows:

(a) Mature;
(b) Relatively mature;
(c) Relatively immature; and
(d) Immature.

A "level of assurance," related to the integrity of results based on the profile of individuals completing the HDSA questionnaire is calculated, recognising some users will be less familiar with the organisational context than others. The question of objectivity in determining HDSA results remains a further complexity, given the small number of studies providing insight to the initial HDSA construct. An evaluation matrix was therefore developed (Appendix B) to assess the level of subjectivity associated with each output, based on user profiles of those completing the evaluation.

The result is a metric with 12 possible outcomes for the organisational maturity evaluation and 90 possible outcomes, classified into a "capability-maturity" grading, for the perspective weighting evaluation, on a scale from "There is a high level of assurance of a dominant perspective" (stating which one) to "There is a low level of assurance that the perspectives are in balance."

Evaluation results are utilised at relevant points in the HDSA workflow, to ensure departures from expectation (based on user inputs) can be highlighted and potential conflicts alerted to users.

Analysis performed in defining the HDSA reveals a number of design implications that directly impact the HDSA logical architecture (Figure 1). Early HDSA results will necessarily depend upon results from HISSOM case studies, given lack of wider results. To develop the HDSA into a more robust decision support tool, an Artificial Intelligence, AI, database engine is required, both locally at each user site and centrally, to facilitate mapping and collation of results from the universe of HDSA installations, providing increased levels of assurance to the HDSA community.

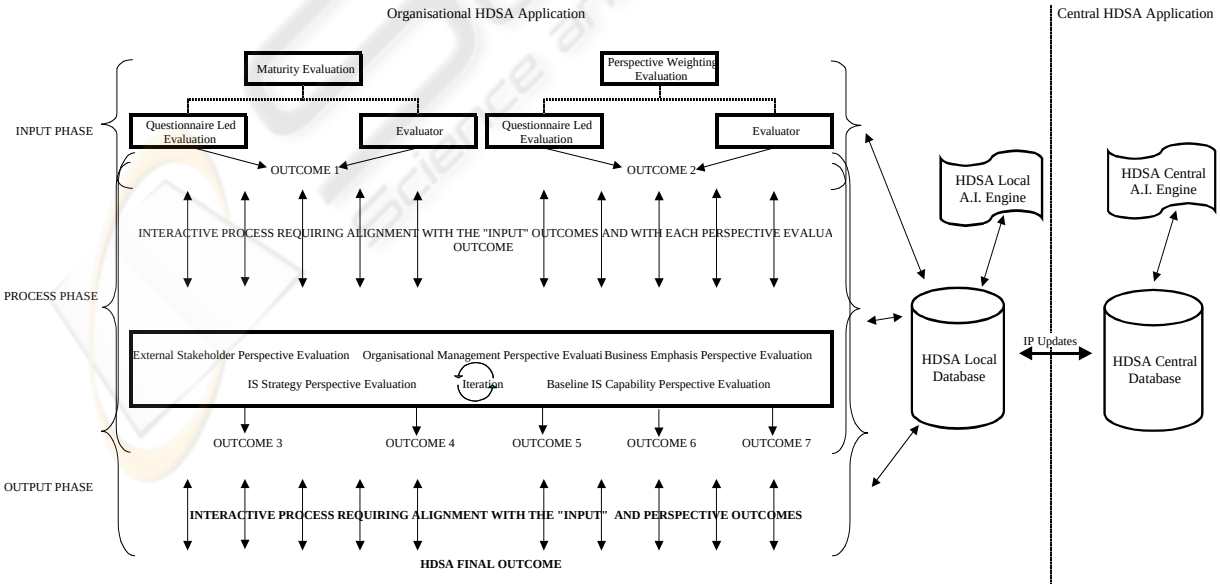

Figure 1: HDSA High Level Logical Architecture.

The HDSA's AI engine will take time to develop fully. Therefore, the HDSA will comprise a *parking lot* table of issues and anomalies that users identify in practice, and store for further consideration, to ensure anomalous results cannot transcend the HDSA workflow unchecked.

The HDSA architecture will accordingly facilitate the collation, interpretation and output of improved results based on increased volumes of data over time, which will increase objectivity based on experiential results from a growing community of users.

Once the perspective weighting and maturity evaluations are complete, the HDSA workflow mirrors HISSOM's five perspective approach, evaluating each perspective against the others, using cross-referenced question sets to assess consistency across layers within each perspective (Appendix A).

Over time, and with use of the distributed HDSA architecture, initial question sets will be modified to ensure a balance of user time commitment and qualitative output is maintained.

Alignment of each perspective questionnaire results with all other HISSOM perspectives and the maturity and perspective weighting evaluations takes place within the "process" phase of the HDSA architecture (figure 1). Action research results and outputs will be used as an initial output set. Over time, the HDSA's AI engine will help build a more cohesive universe of possible outcomes into a more holistic output set, facilitating extension of the HDSA into wider user communities.

HISSOM in practice is not restricted by strict workflow rules, allowing each perspective phase to be completed in any order. Designing this "real-world" iterative workflow approach to IS-alignment into an unsupervised, computerised application, introduces complexity. For example, changing strategic decisions in practice will require iteration with the existing state of alignment that the underlying HDSA database holds.

To aid user understanding of this iterative process, an "evaluation status" will be visible on all key HDSA pages, comprising "compulsory", "optional" and "dependent" classifications. Where a compulsory task changes (such as organisational sign-off of a particular change activity), its dependent tasks will require re-evaluation (such as the IS resource effort required for the change activity) to ensure they remain valid. Optional tasks, such as planning project management resources, will not halt workflow progress to the extent an incomplete, dependent task would. This aspect of the HDSA is critical to providing valid outcomes and will be a key success factor in practice. To facilitate flexibility in practice, the HDSA task grid will be partially user definable, with specific tasks key to the underlying HISSOM model structured in such a way as to ensure a valid outcome can be generated for valid inputs.

3.2 Future HDSA development

Current HDSA development is focused on functional design and logical architecture. The next phase of development comprises:

- Workflow completion (web-based);
- Development of local/central AI engines;
- User profile questionnaire development/analysis;
- HDSA perspective alignment process;
- Supplementary support and maintenance; and
- IP-based process workflow for continuous update of central and local AI engines.

Once the above are complete, user testing and Web-based distribution will follow, before an initial HDSA application is released for practical use.

4 SUMMARY

The HDSA is the result of five years of work involving ethnographic case studies in large, mature organisations, entrepreneurial start-ups and large-scale industry rollouts of new technologies. It incorporates over twenty years of practical experience from the authors. Fundamentally, its foundation is supported by, and extends the literature pertaining to IS- alignment.

The HDSA incorporates unique aspects that target weaknesses in historic IS-alignment methods by incorporating:

- Initial maturity and perspective weighting evaluations;
- Iterative decision support capabilities aligned to each perspective;
- Identification of potential conflicts/anomalies based upon user inputs and intelligent answer sets; and
- Assessment of user profiles incorporating skills, experience and organisational status elements to aid decision support.

No IS- alignment model can guarantee market success. However, the HDSA will provide organisations for the first time with a practical, self-evolving, decision support framework based upon both sound concepts and rigorous practice.

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APPENDIX A – HISSOM MODEL TABULAR REPRESENTATION

HISSOM 3.3 Matrix with transferable & integrated layers

Capability/ Need Classifications	Perspective / Layer / Rationale	Stakeholder	Organisational Management	Business Emphasis	IS Strategy	Baseline IS Capability
Insight, Control & Feedback	**Determination (Metric) Layer** Metrics visible and used to understand and evaluate organisational drivers/direction	External Benchmarks	Market Position (Existing & Future) & Organisational Balanced Scorecard	Organisational & Functional Balanced Scorecards, Financial IS/IS/EIS/DSS	Organisational & IS Balanced Scorecards, Financial IS/MIS/EIS/DSS	Organisational & IS Balanced Scorecards, Financial IS/MIS/EIS/DSS
Organisational Need Layers	**Direction (Driver) Layer** Drivers of organisational strategy supported by Definition Layer	Organisational Objectives	Competitive Advantage, Market Differentiation & Organisational Objectives	Organisational Applications & Knowledge Management Architecture[1]	Organisational Applications & Knowledge Management Architecture[1]	Organisational Applications & Knowledge Management Architecture[1]
	Definition (Decision) Layer Strategy and direction setting activity supporting Driver Layer, interacts with Change, Driver & Metric Layers	Organisational Strategy	Organisational Strategy Planning	Business Function Strategy Planning	Information Systems Strategy Planning	Information Systems Strategy Planning
Collaborative V Combative Equilibrium	**Change Layer** Organisational change activity supporting and gaining insight from Decision Layer, interacting with capability layers (WHAT WE DO)	Change Management[2]	Change Management[2]	Change Management, Continuous Improvement & Project Portfolio[2]	Change Management, Continuous Improvement & Project Portfolio[2]	Change Management, Continuous Improvement & Project Portfolio[2]
	Culture Layer Behavioural context in which organisation develops, operates and interacts; supports & limits all layers (THE WAY WE DO)	Organisational Culture[3]	Organisational Culture[3]	Resource Management & Liaison, Support, Recruitment & Training[3]	Resource Management & Liaison, Support, Recruitment & Training[3]	Resource Management & Liaison, Support, Recruitment & Training[3]
Organisational Capability Layers	**Integrity Layer** Activities maintaining organisational integrity from all key dimensions; supports and limits all layers	Risk & Financial Management, Org Governance (inc. reputation risk)	Risk & Financial Management, Org Governance	Contingency & Capacity Planning, Functional Governance, Security & Control	Contingency & Capacity Planning, IS Governance, Security & Control	Contingency & Capacity Planning, IS Governance, Security & Control
	Infrastructure Layer Core capability necessary for basic organisational operation; supports and limits all layers	People, Process, Org Structure, Data, Technology, Capital	People, Process, Org Structure, Data, Technology, Capital	Functional infrastructure, Processes, Data, Functional structure & HR, Capital	Information Systems infrastructure, Processes, Data, IS structure & IS HR, Capital	Information Systems infrastructure, Processes, Data, IS structure & IS HR, Capital

Notes: (1) Includes Data Sources & External Communications (e.g. EDI, E-commerce, M-commerce); (2) Includes performance measurement for change activities; (3) Includes general and specific policy and procedure issues.

Appendix B
HDSA Maturity & Perspective Weighting Evaluation Matrix Extracts

HDSA Process	Process Steps	Basis of Evaluation	Basis of Judgement	Judgement Type	Potential Influences on Evaluation	Consequential or Mitigating Action	Evaluation Metric			
							Relative/ Absolute	Scenario Universe	Valid Outcomes	
Maturity Evaluation	1.1 Survey evaluation	Survey data input	Survey data	Objective	Evaluator	See 1.2	Relative	4 scenarios	(a)	Mature
			Logical relationships between input data elements	Objective	Completeness	Over time, HDSA AI engine will identify anomalies			(b)	Relatively Mature
			Over time, based on HDSA AI engine	Objective					(c)	Relatively Immature
			Organisation-specific data element relationships	Subjective		Over time, based on HDSA AI engine			(d)	Immature
	1.2 Evaluator	User profile	Position relative to organisational setting	Objective	N/a	Iteration within HDSA	Relative	3 scenarios	(a)	High
						Over time, based on HDSA AI engine			(b)	Medium
									(c)	Low
			Position relative to organisational setting	Subjective		Over time, based on HDSA AI engine				
Perspective Weighting Evaluation	2.1 Survey evaluation (Individual perspectives)	Survey data input	Survey data	Objective	Evaluators	See 2.3	Relative	5 scenarios	(a)	One dominant perspective
			Logical relationships of input data elements	Objective	Completeness	Over time, HDSA AI eng. will identify anomalies			(b)	Two dominant perspectives
			Linkage with Maturity evaluation	Objective					(c)	One weak perspective
			Organisation-specific data element relationships	Subjective		Over time, based on HDSA AI engine			(d)	Two weak perspectives
			Linkage with Maturity evaluation	Subjective					(e)	Balanced perspectives
	2.2 Survey evaluation (All perspectives)	2.1 output	As above	As above	As above	As above	As above	6 scenarios	-	Level 0-5
	2.3 Evaluators	User profile	Position relative to organisational setting	Objective	N/a	Iteration within HDSA	Relative	3 scenarios	-	High, Medium, Low
						Over time, based on HDSA AI engine				
			Position relative to organisational setting	Subjective		Over time, based on HDSA AI engine				