Positioning e-skills within an organisation: An information systems management viewpoint

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ABSTRACT

The intersection of business and IT in an organisation requires people with diverse business- and technology-related competences and skills, commonly referred to as 'e-competences' and 'e-skills'. The positioning of these competences within an IT function in an organisation is (arguably) well defined, but their place in other areas of business managerial concern in an organisation, such as business processes or organisational strategy, is still not sufficiently clear. As e-skills and e-competences are inevitably associated with the use of organisational information systems (IS), this paper reports an initial study aimed at positioning these competences and skills within an organisation from an IS perspective. The positioning was done by examining models of IS, e-competences and e-skills and identifying their possible areas of intersection, which resulted in mapping these competences and skills to the areas of managerial concern in an organisation – as seen from an IS perspective. This mapping has revealed an initial understanding of how business value, here seen as business benefits, is created by using the e-skills and e-competences (supposedly) possessed by employees throughout an organisation.

INTRODUCTION

Digital technology is at the heart of the modern economy as it adds value to practically all organisations – it directly affects companies in all sectors and individuals in all walks of life. Businesses, in particular, have significant opportunities to grow by creating and deploying information and communication technologies (ICT). However, the use of ICT is linked to two crucial challenges. One challenge is to ensure technology is aligned with the business strategy and processes throughout the organisation, thus enabling innovation, creating benefits and opening new markets. The other challenge is that technology is associated with having competent (e-competent) and skilled (e-skilled) employees. It is believed that the combination of highly skilled technology professionals, technology-savvy business leaders and competent IT users can enable an organisation's effective participation in the world of the knowledge economy (Bytheway 2004; e-skills UK 2010a). The latter challenge is a concern of this study.

In the context to this study, the term 'e-skills' refers to the ability to develop and use ICT to adequately participate in an environment increasingly dominated by access to electronically-enabled information, and a well-developed ability to synthesise this information into effective and relevant knowledge. E-competence refers to a demonstrated ability to apply skills (e-skills), knowledge and attitudes to achieve observable results. However, e-skills are in very short supply all over the world. For example, Europe's growing shortage of people who are competent and skilled in ICT is affecting the productivity and competitiveness of large and small organisations across society. The UK industry alone needs 110 000 new people a year to enter IT careers – well exceeding the current supply (Europa 2010; e-skills UK 2010b).

The situation in South Africa does not appear to be much better. It is estimated that South Africa experiences a shortage of over 70 000 IT professionals (ITWeb 2008). The shortage of e-skills is even more worrying, as the supply of ICT graduates is showing a decline (Accenture, 2008; Birchwood Declaration, 2007). This general lack of e-skills in the country is seen by the Department of Communications (DoC) as a real impediment to meeting its commitment to the Millennium Development Goals (MDGs), the World Summit on Information Society (WSIS) Plan of Action, the New Partnership for Africa's Development (NEPAD), and the South African Medium Term Strategic Framework (MTSF) (Department of Communication 2007). Locally, e-competences and e-skills are seen as vital issues in addressing poverty, sustainable livelihoods, the fight against crime, the building of cohesive communities, international cooperation, and the building a developmental state (NeSPA, 2010).

PROBLEM AND OBJECTIVES

In the context of the technology tools available today, the way e-skills (and e-competences) are shaped for this century is important, as the ICT professional of the 21st century needs to be able to respond to the demands of the workplace in an inter-, multi- and trans-disciplinary manner (Wesso 2008a). The intersection of business and IT requires people with diverse experiences, multidisciplinary knowledge, and technological understanding – 'hybrid' professionals. The ICT professionals need to have the competences and skills required to fully understand the business of the organisation (Wesso, 2008a), and business managers and users should posses IT/IS-related skills and competences to realise the full potential of the available technology.

In order to identify the e-skills needed by an organisation, these skills should be defined as precisely as possible, as the rapid transformation of today's businesses from 'industrial economy' to 'knowledge economy' is expanding the scope and purpose of such skills –thus creating a great challenge for organisations (Lanvin & Passman 2008). The pertinent literature, however, has shown that there is no

commonly agreed upon definition of e-skills – these are currently defined by the various areas of ICT competences. On the basis of documents from the World Summit on the Information Society (WSIS) (2003) and the European e-Skills Forum (2004), the South African Meraka e-Skills Institute (e-SI) defines e-skills as

> *…the ability to develop and use ICT within the context of a knowledge environment and associated competences that enable the individual to participate in a world in which ICT is a requirement for advancement in business, government and civil society*
>
> (Wesso 2008b:37)

In the above regard, it is recognised that the term 'e-skills' encompasses a wide range of capabilities (e.g. knowledge, skills and competences) spanning a number of economic and social dimensions (World Summit on the Information Society 2003). Thus it was necessary to establish a number of underlying, distinguishable e-skills concepts that would be useful for various purposes (e.g. for research, policy analysis, development and response purposes). For the research reported here, two interrelated, broad concepts were of primary interest:

- e-skills
- e-competences.

Using the ideas of the European e-Skills forum (2004) as basis, the Meraka e-Skills Institute (e-SI) has classified four types of e-skills, (1) ICT practitioner skills, (2) ICT user skills, (3) e-business skills and (4) e-literacy. Following work done by the European e-Skills Forum on e-skills, a large number of European ICT and human resources (HR) experts have developed an e-competence framework (e-CF). The motivation for this is that e-competences are needed for the ICT business-related workplace, including competences for users, ICT practitioners and e-business managers (European e-Competence Framework 2008).

But where in an organisation are these skills, possessed by 'hybrid' professionals, positioned? What is the business value of these competences and skills from an IS perspective, for example, how can business benefits be derived by appropriately using e-competences and e-skills? These questions have still not been answered adequately, either in a global or South African context. Although there is (arguably) a well-developed framework (i.e. skills framework for the information age – SFIA) that can be used for positioning IT professional skills, no models or theories are available that will give precise answers to where the other types of e-skills (i.e. user e-skills, business e-skills or e-literacy skills) are positioned within an organisation and how they relate to the achievement of business benefits. The answers to these questions would be useful for:

- **academics:** to do research and derive models and theories for practical application and teaching
- **practitioners (IS/IT, managers, business managers and the HR function):** to determine where particular skills and competences are needed within an organisation if business benefits are to be derived from their adequate employment.

The article reports on research that was undertaken to obtain an initial understanding regarding, (1) the positions of various e-skills and e-competences required by managerial areas of concern in an organisation (e.g. business processes or strategy), (2) the way in which business benefits are achieved by using these skills and competences and (3) establishing a foundation for an initial e-skills and e-competences positioning model. As e-skills and e-competences are inevitably linked to the efficient and effective use of organisational information systems – and the underpinning technology – the positioning of e-skills and e-competences is done from that perspective.

POSITIONING E-SKILLS

Approach

The positioning of e-skills and e-competences within an organisation requires (at least) three conceptual components, namely, (1) e-skills model/s, (2) e-competences model/s and

(3) IS model/s, which include not only IT and IS functions, but also areas of managerial concern such as business processes, business benefits and business strategy. Ideally, it would be useful to review the literature on the intersection between e-skills, e-competencies and managerial models that include the information systems component, but such works could not be obtained readily.

The reviewed literature included some works loosely related to this study, for example, Fonstad and Lanvin (2010), INSEAD (2008), Lanvin and Passman (2008) and Valenduc and Vendramin (2005), and implicitly link e-skills or e-competences to ICT systems. These works, however, did not offer sufficient understanding about either the position of these skills within an organisation or the possible way in which benefits could be derived by using them. The information systems literature, on the other hand, revealed some well-known IS models that include skills components. However, these components were narrowly and indirectly related to IT architecture skills (Henderson & Venkatraman 1993) or broadly related to organisational administrative and business skills (Luftman & Brier 1999) – thus, not giving answers to the questions posed by this study.

As appropriate works dealing directly with the intersection between e-skills, e-competences and IS models could not be found, this author continued reviewing the available literature on e-skills, e-competences and IS in order to identify suitable models from these fields that could be combined usefully to explain the positioning of these skills and competences within an organisation. The combined model would hopefully also be able to explain how business benefits can be derived from using e-skills and e-competences (appropriately). After reviewing the literature regarding e-skills and e-competence models, this research concentrated on the e-skills model of the e-Skills Institute (e-SI) and the European e-Competency Framework (EeCF). The e-SI model provided a useful broader classification of e-skills, which was mapped against the organisational areas of managerial concerns, while the EeCF helped with describing e-competences supposedly possessed by employees in order to effectively execute their roles within these areas of organisational managerial concern and achieve business benefits (UGe-CF 2008).

The reviewed contemporary IS literature revealed some works on IT/IS professional skills, such as business analysis, web development, database management, help desk/technical support, networking, project management and security (e.g. Brandel 2009; Global Knowledge 2010). Being practitioner's skills, as classified by e-SI, these skills are all positioned within the IT and IS domains in an organisation. Other organisational areas of managerial concern (business, processes, benefits or strategy) were not included in these works. However, the further review of the pertinent IS literature disclosed a model – the Information Management Body of Knowledge (IMBOK) – containing both technological components (IT and IS) and business components – areas of business managerial concerns such as business processes, business benefits and strategy (Bytheway 2004). Thus, e-skills (the e-SI model) and e-competences (the EeCF model) are mapped against the IMBOK model. This allowed for the positioning of e-skills and e-competences in a way that reveals how business benefits are derived by using these skills and competences appropriately.

e-SI e-skills model

The e-SI model describes four categories of e-skills, as follows (Wesso 2008b:37):

- ICT (e-)practitioner skills
- ICT (e-)user skillse-Business skills
- e-Literacy.

ICT (e-)practitioner skills

The capabilities required for researching, developing, designing, managing, producing, consulting, marketing, selling,

integrating, installing, administrating, maintaining, supporting and servicing ICT systems.

ICT (e-)user skills

The capabilities required for the effective application of ICT systems and devices by the individual. ICT users apply systems as tools in support of their own work, which is, in most cases, not directly related to ICT. User skills include the utilisation of common generic software tools and the use of specialised tools supporting business functions within industries other than the ICT industry.

e-Business skills

The capabilities needed to exploit opportunities provided by ICT, notably the Internet, to ensure the more efficient and effective performance of different types of organisations, to explore possibilities for new ways of conducting business and organisational processes, and to establish new businesses.

e-Literacy

The capabilities needed to socially appropriate ICT for local development, namely that being digitally literate implies being able to search and retrieve information to navigate and communicate on-line, to participate in digital and virtual communities. It is perceived as a key element in the battle to overcome social exclusion and division in the information society. This fourth element of e-skills, as explained by Wesso, extends the digital literacy concept defined by the European e-Skills Forum (2004).

Although it is useful for the initial positioning of e-skills within an organisation, it should be noted that this e-SI model is still too general in nature. It needs conceptual unpacking if a thorough understanding of the position and role of e-skills in an organisation is to be achieved. Although some (rare) e-skills unpacking work was found (e.g. Romani 2009), it was not sufficient for the purposes of this study. Realising the need to further develop this model, e-SI is currently facilitating a broader discussion among academics and business and government representatives in South Africa that is aimed at unpacking and more precisely defining these four categories of e-skills.

European e-Competence Framework

The European e-Competence Framework (e-CF), following the 'e-skills' definitions adopted by the European e-Skills Forum, focuses on the competences needed to, (1) develop, operate and manage ICT projects and processes, (2) exploit and use ICT, (3) make decisions and develop strategies and (4) foresee new scenarios. This framework considers end users, business managers and ICT (IT/IS) practitioners, but does not include competences related to basic/scientific research in the ICT field. The e-CF focuses on competences that are needed and applied in the ICT business-related workplace and is aimed at aligning the needs and views of companies, reflecting company requirements regarding specific skills and job profiles (UGe-CF 2008).

In the above context, competence is defined as a demonstrated ability to apply knowledge, skills and attitudes for achieving observable results. Consequently, the e-competence description embeds and integrates *knowledge* (set of know-what), *skills* (ability to carry out managerial or technical tasks) and *attitudes* (cognitive and relational capacity – e.g. analysis capacity, synthesis capacity, flexibility, pragmatism). The e-CF is structured in four dimensions, which reflect different levels of business and human resource planning requirements:

- **Dimension 1:** Five e-competence areas, derived from the ICT business processes (Plan – Build – Run – Enable – Manage).
- **Dimension 2:** A set of reference e-competences for each of the above areas, with a generic description of 32 e-competences.
- **Dimension 3:** Proficiency levels for each e-competence

TABLE 1
Relevant dimensions of the European e-Commerce Framework

Dimension 1	Dimension 2
Plan	A.1. IS and Business IS and Business Strategy Alignment
	A.2. Service Level Management
	A.3. Business Plan Development
	A.4. Specification Creation
	A.5. Systems Architecture
	A.6. Application Design
	A.7. Technology Watching
Build	B.1. Design and Development
	B.2. Systems Integration
	B.3. Testing
	B.4. Solution Deployment
	B.5. Technical Publications Development
Run	C.1. User Support
	C.2. Change Support
	C.3. Service Delivery
	C.4. Problem Management
Enable	D.1. Information Security Strategy Development
	D.2. ICT Quality Strategy Development
	D.3. Education and Training Provision
	D.4. Purchasing
	D.5. Sales Proposal Development
	D.6. Channel Management
	D.7. Sales Management
	D.8. Contract Management
Manage	E.1. Forecast Development
	E.2. Project and Portfolio Management
	E.3. Risk Management
	E.4. Relationship Management
	E.5. Process Improvement
	E.6. ICT Quality Management
	E.7. Business Change Management
	E.8. Information Security Management

provide European reference level specifications on e-competence levels e-1 to e-5.
- **Dimension 4:** Knowledge and skills related to the e-competences are indicated as optional framework components for inspiration.

For the purposes of this study, the competence dimensions 1 and 2 (Table 1) will be considered further, as these dimensions were found to be sufficient for mapping e-competences against the selected IS framework – IMBOK.

According to the e-CF, *Plan*, *Build* and *Run* are core areas, whilst *Enable* and *Manage* are cross-cutting issues referring and related to the former. They all reflect the ICT business process and its main sub-processes from a very general perspective. *Plan* and *Enable* represent strategic areas within companies that conceive, decide, design and set up products, services, actions and policies. *Build* and *Run*, on the other hand, provide operative sub-processes. *Manage* represents companies' daily business administration and improvement.

IMBOK model

In order to understand the competences that deliver organisational strategy with appropriate information technology from an IS perspective, IMBOK identifies five areas of 'requisite competences' or areas of managerial concern:

- information technology
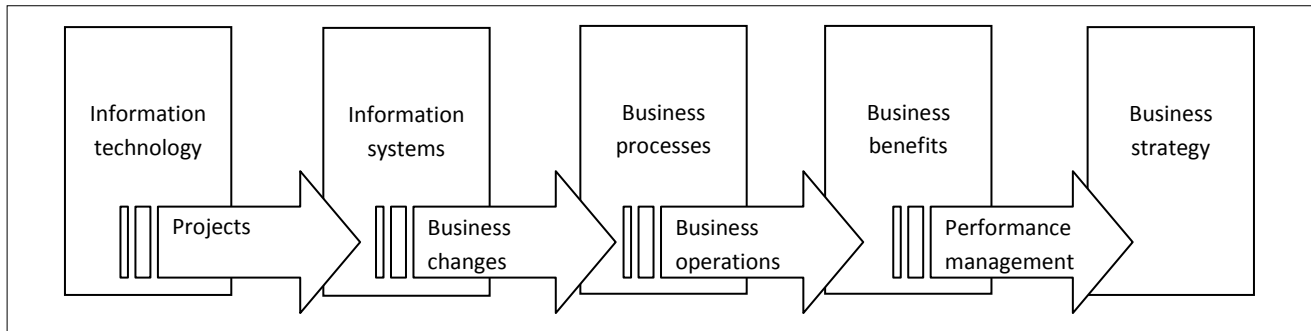- information systems
- business processes

FIGURE 1
IMBOK Framework (from Bytheway 2004:12)

- business benefits
- business strategy.

These 'requisite competences' are not to be confused with the e-competences described above. IMBOK competences are associated with the challenging task of moving managerial thinking from one of these areas to another.

These five areas of organisational management interest require distinctly different skills *and* competences (Bytheway 2004:8). These skills and competencies refer primarily to the information systems and information management – both linked to the employees' ability to use the system effectively. Thus, it seems that each of these areas (see Figure 1) requires certain e-skills and/or e-competences of some kind. This requirement for e-skills and e-competences stems from the fact that an organisational information system, based on the relevant technology (IT), is used in all these areas of managerial concern. An organisational information system supports business processes, which are the only places where business benefits can be realised. In this way, an organisational information system supports the operationalisation of the current business strategy (and assists in creating future strategies), which is tightly linked to the organisational processes in which strategy is to be executed.

According to the IMBOK, these areas of managerial concern in an organisation are linked by certain processes, as shown in Figure 1. In order to support an organisational business strategy with information technology, it is necessary to establish an information system project (here named 'Projects'). The organisational information system (usually) requires some changes to be made in the current business processes ('Business changes'), which, in turn, influence overall business operations ('Business operations'). Managing performance ('Performance management') then helps to determine whether, and to which extent, the business strategy is achieved. However, each of these linking processes requires the participation of employees possessing various skills and competences, including e-skills and e-competences.

The assertion that all five areas of managerial concern and all five IMBOK processes require, *inter alia*, certain e-skills and e-competences, gives rise to the questions, what kind of e-skills and/or e-competences are needed for these areas and processes, and how do these skills and competences participate in giving rise to business benefits?

MAPPING E-SKILLS AND E-COMPETENCES TO IMBOK AREAS AND PROCESSES

Mapping e-skills

After comparing the definition of each e-skill provided by the e-SI model with the description of the areas and processes of the IMBOK, it is concluded that the areas of *information technology* and *information systems* inevitably need *practitioner e-skills*, as these areas are linked, for example, to developing, designing,

managing, integrating, installing, administrating, maintaining, supporting and servicing IS/IT systems.

User e-skills are required in the area of *business processes*, where employees deploy these skills to achieve business benefits (*business benefits*). The same (kind of) skills are required by business leaders in the area of *business strategy*. However, at the strategic management level, it is not sufficient to possess user e-skills only, which can help managers to effectively use organisational IS. They also need *business e-skills*, which allow them to exploit strategic business opportunities provided by contemporary IT – the Internet-based business (e-business), for example.

The area of *project processes* also requires the project team members to possess *user e-skills* in order to utilise, for example, IT-based project-related applications, such as MS Project. The participants in the *project processes* are also supposed to understand organisational business strategy as it is executed in various organisational projects (Bytheway, 2004). In this regard, *business e-skills* would be helpful (at least) at the project managerial level.

The *business change processes* are inevitably linked to *business e-skills*, as these skills can help in exploring new ways of conducting business or improving organisational processes. These skills are also required by *performance management* processes, as *business e-skills* can help by ensuring the more efficient and effective performance of different types of organisations (UGe-CF 2008). On the other hand, *business operation* processes require that the workforce engaged in these processes possess *user e-skills* in order to harness the power of modern information systems and their underlying technology. For an overall view, the above discussion is summarised in Table 2.

Hitherto we have explored the role of three kinds of e-skills provided by the e-SI classification. The fourth kind of skill, *e-literacy*, is ostensibly a prerequisite for acquiring other kinds of e-skills (*user, business and practitioners)* and can, therefore, be linked to these skills. In essence, *e-literacy* is a concern more of the social appropriation of ICT (e.g. building an inclusive information society), but in this era characterised by the pervasiveness of ICT throughout business and society, it can also be seen as a prerequisite for successful small businesses development.

Mapping e-competences

Regarding the e-competences required by the IMBOK areas of managerial concerns and the processes linking these areas, it was found that the competence areas of *Plan, Build, Run, Enable* and *Manage* (all belonging to the *Dimension 1*) are (selectively) required by all IMBOK areas and their linking processes (see Table 2). The e-competence area of *Plan* is required by all IMBOK areas of managerial concern and their linking processes. For example, a sub-competence of this e-competence, named *IS and business strategy alignment*, spans the IMBOK model, and has as its essential role that of addressing this alignment. The

TABLE 2
Mapping e-skills and e-competence to IMBOK areas and processes

Items	Required e-skills			E-competences Dimension 1				
	Practioner	User	Business	Plan	Build	Run	Enable	Manage
Organisational area of managerial concern								
Information technology	√	-	-	x	x	x	x	x
Information systems	√	-	-	x	x	x	x	x
Business processes	-	√	-	x	x	x	x	x
Business benefits	-	√	√	x	x	x	x	x
Business strategy	-	√	√	x	x	x	x	x
Organisational process								
Projects	√	-	√	x	x	-	x	x
Business changes	-	-	√	x	x	x	-	x
Business operations	-	√		x	x	x	x	x
Performance management	-	-	√	x	-	x	x	x

TABLE 3
Mapping e-CF e-competences against IMBOK areas and processes

Items	Required e-competency Dimension 1 & 2				
	Plan	Build	Run	Enable	Manage
Organisational area of managerial concern					
Information technology	A.2 ; A.4 ; A.5 ; A.6 ; A.7	B.2 ; B.3 ; B.5	C.1; C.3; C.4	D.1; D.2; D.3	E.3; E.6; E.8
Information systems	A.1; A.6	B.1 ; B.2 ; B.3 ; B.4 ; B.5	C.1; C.3; C.4	D.1; D.2; D.3	E.2; E.3; E.6; E.8
Business processes	A.2 ; A.4	B.4	C.1; C.2; C.3; C.4	D.1; D.4; D.5; D.6; D.7	E.5; E.8
Business benefits	A.3	B.4	C.2; C.4	D.8	E.2; E.4; E.7
Business strategy	A.1 ; A.3	B.4	-	D.5	E.1; E.5; E.7
Organisational process					
Projects	A.1 ; A.4 ; A.5 ; A.6 ; A.7	B.1; B.4	-	D.1; D.2; D.3	E.2; E.3; E.4; E.7; E.8
Business changes	A.1	B.4	C.1; C.2; C.4	-	E.2; E.3; E.5; E.7
Business operations	A.2 ; A.4	B.2; B.3; B.4	C.1; C.3; C.4	D.2; D.3; D.4; D.5; D.6; D.7; D.8	E.5 ; E.8
Performance management	A.1	-	C.4	D.4; D.5; D.8	E.2; E.3; E.7; E.4; E.5

e-competence *Enable*, with its sub-competence named *information security strategy development*, also spans all IMBOK areas.

Manage is another e-competence that spans the IMBOK model, as all its areas of managerial concern and their linking processes require effective management. For this the *Manage* sub-competences *forecast development*, *project and portfolio management*, and/or *risk management* appeared to be essential.

The *Build* e-competence, with its sub-competences of *design and development*, s*ystems integration*, *testing*, and *solution deployment*, for example, touches all IMBOK areas of managerial concern and their linking processes – except for *performance management*. On the other hand, the *Run* e-competence is required by all IMBOK areas of managerial concern, but not by all the linking processes. This e-competence is not required by the *project processes*, as it concerns user support, change support, service delivery and problem management.

The detailed, but inevitably still embryonic, mapping of e-competences (Dimensions 1 and 2) against IMBOK areas of managerial concern and linking processes is given in Table 3. The sub-competences are given in accordance with the classification in Table 1.

Diagrammatically, the mapping of e-skills and e-competences (Dimension 1) against the IMBOK management areas and processes is shown in Figure 2. By positioning e-skills and e-competences in this way, it became evident that their selective deployment in all areas of managerial concern and in the linking processes is necessary if business value, as seen through business benefits, is to be achieved.

Limitations

The discussion about the positioning of e-skills and e-competences within areas of managerial concern in an organisation, and about the linking processes, would not be adequate if some key limitations are not mentioned. The general nature of the e-skills model of the e-Skills Institute (e-SI) is insufficient for determining specific user and business e-skills in the manner done by the Skills Framework for the Information Age Foundation (SFIA 2008) for the e-skills of practitioners. As already stated, the e-SI model needs some conceptual unpacking and more detailed definitions of user, business and literacy e-skills in order to be useful for practitioners. Another crucial limitation is seen in the still-unclear relationships between various e-skills and e-competences. Although the e-competences framework is built on the e-skills concept (as discussed earlier), it seems to represent a (much) broader idea, including the concepts of knowledge, skills and attitude. On the other hand, some definitions of e-skills include the notion of competence: it is proposed that e-skills are defined as

> *the ability to develop and use ICTs within the context of a knowledge environment and associated competencies that enable the individual to participate in a world in which ICT is a requirement for advancement in business, government and civil society.*
>
> (Wesso 2008b:37)

Clarifying a definition that can help in determining the relationships between e-skills and e-competences certainly deserves urgent attention.

CONCLUSION

The aim of this research was to obtain an initial understanding of, (1) the positions of various e-skills and e-competences required by managerial areas of concern in an organisation (e.g. business processes or strategy), (2) the way in which business benefits are achieved by using these skills and competences and (3) to establish a foundation for an initial e-skills and e-competences
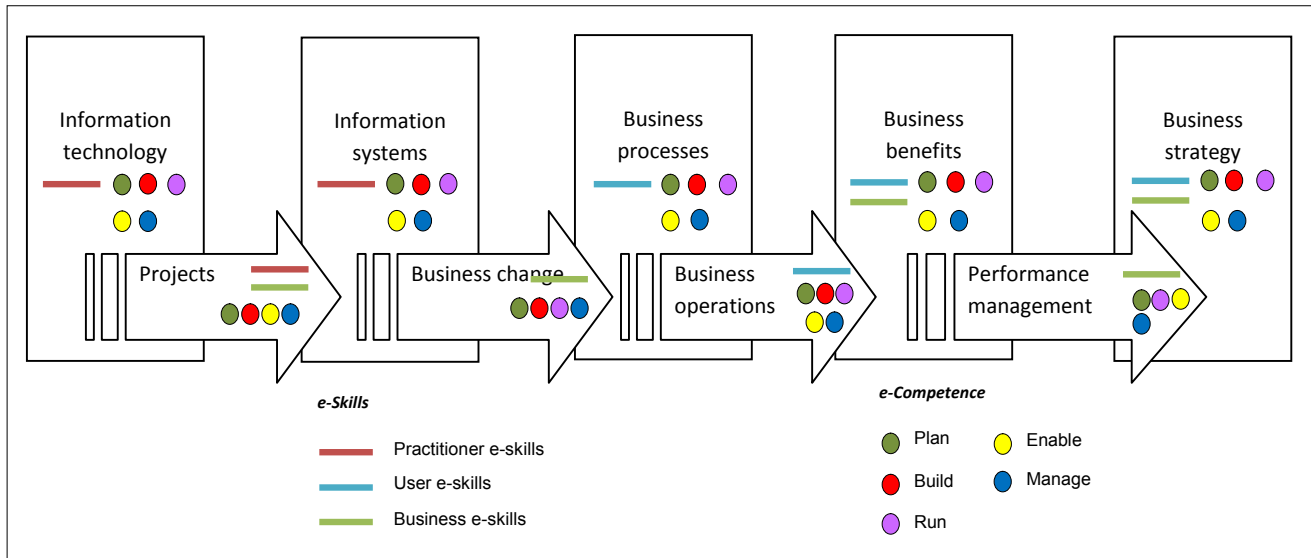
FIGURE 2
Mapping e-skills and e-competences against IMBOK areas and processes

positioning model. To achieve these objectives, it was necessary to identify appropriate models of e-skills and e-competences, as well as an IS model that explicitly includes business components such as business processes, benefits and strategy. It was found that the e-skills model of the Meraka e-Skills Institute (the e-SI model) and the European e-Competence Framework (e-CF) were sufficient for this initial positioning. The Information Management Body of Knowledge (IMBOK) model, containing all the required business components, was found to be suitable for this positioning.

The positioning of e-skills and e-competences within the managerial areas and processes of IMBOK was done in accordance with the relevant description of the concepts used. This resulted in an understanding that all IMBOK areas and processes required the deployment of particular e-skills and e-competences. Accordingly, the initial positioning model is done by mapping these skills and competences against the relevant IMBOK areas and processes. By positioning e-skills and e-competences in this way, it became evident that their (selective) deployment in all areas of managerial concern in an organisation, and in the associated linking processes, is necessary if business value, as through business benefits, is to be achieved.

The author believes that this positioning model could provide a foundation for supporting an organisation's decision making regarding the e-skills and e-competences needed for the areas of managerial concern (as described here) and the associated linking (organisational) processes. This positioning model could be particularly useful in identifying 'a competence shortfall between the current and needed competence levels of individual staff within organisations' (European e-Skills Forum 2004:5). As this study suggests, this process should not be the concern only of HR, but also of the IS/IT and business managers, as all of them should participate in determining where particular e-skills and e-competences are needed in an organisation. This initial positioning of e-skills and e-competences might also be of academic interest, as this is an embryonic work and necessarily needs more research, understanding, modelling and, ultimately, teaching.

However, as it is still embryonic, this model has key limita tions, seen *inter alia* in the general nature of the e-SI e-skills model and the still unresolved relationship between the concepts of e-skills and e-competences. Thus, this positioning model needs to be developed and tested further before it can be recommended for practical or academic use.

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