BUSINESS INTELLIGENCE COMPETENCY CENTRES AND THEIR ROLE IN DEVELOPING HUMAN CAPITAL: A CASE STUDY OF THE CENTRE OF COMPUTER AND INTERNET AT THE UNIVERSITY OF MOSUL

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ABSTRACT

Purpose: We need to invest in Business Intelligence Competency Centres (BICCs) in order to evaluate training needs in the light of the changes in the business environments of universities. There is a need to develop Human Capital (HC) that is capable of not only owning knowledge, experience and skill, but also earning the capabilities and capacities to respond to the path of development in their respective academic fields. This capability must be applied consistently and creativity and thus contribute to the achievement of organisational entrepreneurship in a knowledge-based economy possessing HC.

Design/methodology/approach: The Centre of Computer and Internet (CCI) at the University of Mosul in Iraq was chosen as a case study to represent BICCs in developing HC for several reasons, the most important of which is that the CCI has several innovative methodologies that have breathed life across Mosul University through responding to learning and training needs.

Findings: One of the issues that we highlight is that BICCs not only improve the creative and innovative power of HC, but also facilitate certain creative experiences and support organisations, enabling them to face highly dynamic environments.

Originality/value: This research clarifies the experience of the CCI at the University of Mosul regarding the preparation and development of HC.

INTRODUCTION

Business Intelligence Competency Centres (BICCs) play a fundamental role in empowering knowledge-sharing and improving human skills, particularly analytical skills, and represent a move adopted by organisations for the development of their Human Capital (HC) in order to take advantage of Business Intelligence (BI) solutions in goal attainment. The most important responsibilities of these centres lies in the training and development of strategic HC, which focuses on analytical skills, which lead to converting analysis into creative and innovative actions.

In other words, if the value of HC increases with investment in training and development, business organisations should accordingly focus on building BICCs as central structures that allow them to implement their investment and ensure the delivery of best practice. Lessons learned can thus be shared with all individuals working in these organisations. As a result, the organisations will be able to generate HC that is fluent in innovation.

Research problem

HC is described as the most critical factor in the survival and success of business organisations in a competitive environment. Investing in skills and abilities that are possessed by individuals in those organisations reflects the investment in entrepreneurship and innovation in the framework of that competitive environment and is part of the movement towards working in a knowledge-based economy that depends in turn on HC.

From this logic, we get to the intellectual and field dilemma that lies in finding and employing the innovative organisational structures that in turn help the management and development of HC in the light of the organisations' renewable needs. One of those innovative structures are BICCs, which aim to enrich HC development, particularly the technical side. BICCs also help in the success of BI initiatives and organisational entrepreneurship, including e-entrepreneurship. Accordingly, we can summarise this dilemma via a key question: What is the role of BICCs in developing HC at the University of Mosul?

Importance of the research

The importance of this research lies in evaluating one of the most important future directions in the development of HC, which is BICCs. This research demonstrates the need to increase the awareness of organisations regarding the importance of these centres in building, finding and developing HC.

Research objectives

According to the framework of the research problem and its importance, the main goal of this research lies in verifying the role of BICCs in developing HC, and this goal is divided into the following sub-objectives:

- Clarification of the concept of BICCs and their importance in business organisations, as well as the role of these centres in the development of HC in the form of people who in particular possess analytical skills.
- Highlighting the experience of the Centre of Computer and Internet (CCI) at the University of Mosul as a successful example of a centre for competence in the Iraqi environment.

Methodology and hypothesis of the research

The case study approach is a distinguished method and allows in-depth research in all aspects of the phenomena, situations and problems under discussion. Therefore, we use this approach to identify the phenomenon and problem to be studied, and identify concepts and test the

following hypothesis: The use of BICCs contributes to the development of HC at Mosul University. We have selected a representative sample of the situation in order to generalise later, collected the data and information that is related to the problem under study, and recorded and analysed this information in order to obtain our final results before working to disseminate these through developing our conclusions and suggestions.

LITERATURE REVIEW

HC and its management

Ehrenberg and Smith (2011, p.1) discussed the concept of HC through its role in providing added value to organisations. This added value originates from the individuals working in these organisations. From this standpoint, Ehrenberg and Smith (2011) illustrated their definition of HC, which is an intellectual concept used to clarify the differences between organisations in terms of their competitive advantages. In other words, HC can be described as an actual basis for the creation of competitive advantage. When analysing this perspective, we noticed that HC lies in a set of skills and knowledge which is possessed by individual workers who can be rented by employers in order to achieve mutual interests.

Schultz (1961) was the economic expert who was the first to promulgate the concept of HC through his famous scientific discussions. Schultz demonstrated that the return on investment in HC through education and training in the USA was the largest from the return on investment in physical capital. In 1998, Schultz developed his concept of HC, which is all human capabilities that may be innate or acquired. Accordingly, Human Qualities is a basis on which to achieve the capacity, which can be counted as value itself, and organisations should invest in this value in order to expand the options available to them.

However, Adam Smith (1776) who was the first to propose the term HC in his famous book named *The Wealth of Nations*, discussed the differences between the working methods of individuals and their levels in terms of learning and training, and its reflection on the differences in the returns necessary to cover the costs of obtaining the skills of those individuals. In addition, Elliott (1991) focused on the quality of HC and he urged organisations not sufficiency endowed with the correct quantity of HC in relation to work supply

to reevaluate, because the decision to acquire or develop individuals' skills involves spending resources now in order to achieve future returns (Baron and Armstrong, 2007, p.8).

Bontis et al. (1999, p.400) have defined HC as the human side in organisations and this portion combines the intelligence, experiences and skills that give those organisations their distinctive character. Because human resources in organisations are capable of learning, change and innovation, organisations should provide the creative momentum for these human resources by building innovative structures and proper motivation to ensure survival and success in the long run. These organisations should also give attention to HC as a source of innovation and renewal, because their HC has the mentality ability, skills and experience necessary to provide appropriate practical solutions for stakeholders (Stewart, 1999).

HC is one of the most important components of intellectual capital, and we can define it as all workforces in organisations that possess the ability to think and create. HC occupies a position of fundamental importance because it is a source of innovation and strategic renewal. Organisations could sustain their HC by training and developing via innovative structures such as BICCs. The operations of training and development might include the use of brainstorming and reengineering processes as well as improving personal skills for individuals.

Therefore, we can say that HC lies in the experience of collective work which could be developed through organisational structures that are built with a view to investing in basic skills and knowledge as well as exploiting these structures in order to achieve value.

The importance of HC stands out as a result of the role it plays in organisations. HC contributes to reinforcement of the capabilities of organisations to respond to the changes that occur in their internal and external environments. Hussain (2007, p.70) outlined the following points to clarify the importance of investing in HC:

- The ability of HC to provide new solutions through creation and innovation processes. In addition, HC contains social properties and can work to create interaction and engagement within the organisation, thus achieving the desired performance.
- HC is a competitive weapon and a source of competitive advantage.

- HC reflects the value of everything in the organisation.
- HC represents the shared values of the organisation and its culture and philosophy.
- HC is the main generator of knowledge, especially tacit knowledge; HC is also a knowledge-holder.
- HC affects creativity in manufacturing processes, customer-relationships and corporate performance.
- HC has the ability to manage human thought quickly and provides crucial executive expertise.

The management of organisations means managing a group of individuals who share values and goals and have unique characteristics which makes them count as real assets and valuable resources. These assets and resources need specialised management for handling their realisable values. Human Resources Management (HRM) is therefore a practical application to exploit these values. HRM includes processes to acquire, improve and retain the best talented individuals through the implementation of the appropriate processes and systems to achieve the objectives of organisations. Therefore, HC Management, as a part of HRM means management of the knowledge and skills possessed by talented individuals in order to achieve personal and shared goals.

In the Iraqi environment, we noted that most of the organisations have diverse HC, and especially the larger ones. This diverse HC extends along the disciplines necessary to accomplish the organisation's work. Perhaps one of the most important disciplines which organisations require today is technological HC to work on building all kinds of information systems, especially the systems and solutions of BI, which in turn helps to achieve the goals of these organisations efficiently and effectively. Organisations should therefore study this type of HC as well as developing the structures to exploit it.

BI and its evolutionary stages

The term BI has emerged with the new innovative style products that have been developed based on sophisticated statistical and retrieval algorithms, which have in turn a fundamental role in the integration and maturity of BI systems. BI products are therefore described primarily as tools of Decision Support Systems (DSS), which then evolved towards applications of Executive Information Systems (EIS). These were later described as Data Mining Systems for the discovery of knowledge, and finally named BI Systems (Pareek, 2007, p.15).

Luhn (1958, p.314) founded the concept of BI in his research titled "A Business Intelligence System", published in the IBM Journal in 1958. Luhn's concept was based on the definition of three key terms, as follows:

- *Business*: a range of the activities that must be accomplished to achieve any purpose, whether these activities are technological activities, commercial business activities, legal activities or other types of activity.
- *Communications systems*: these serve business behaviour in the broadest concept as an —intelligent system in the business unit.
- Finally, *Intelligence*: the ability to diagnose and understand the interrelationships between facts, as well as diagnosing and understanding in an effectively manner, which guides the businesses towards achieving their desired goals.

Luhn's concept of BI can be summarised by using the technologies of selective dissemination for information automatically among the various departments of an organisation. In his paper, Luhn has identified three critical technological components for the implementation of BI, which are:

- the automatic summarising of documents;
- the automatic encoding of documents and
- the automatic generating and updating of documents (Agrawal, 2009, p.79).

We can illustrate Luhn's idea via a critical point, which is his simulation of how to use specific data and then disseminating it to selected users in order to achieve the activities and operations that are entrusted to them. Therefore, this critical point is the foundation that is built upon the concept of BI today.

Howard Dresner[1] defined the concept of BI as a broad category of the software and solutions used to collect, consolidate, analyse and provide access to data in a way that allows for end-users in

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[1]A researcher at the Gartner Group for Researches, the spiritual father, and the first to introduce the modern concept of Business Intelligence in 1989.

organisations to take the best decisions (Jian-bo, 2012).

Since that time, many researchers and leading organisations in the field of computerised systems have used several concepts to describe BI. These definitions differ among themselves in terms of the perspective adopted by researchers and organisations in order to give a clear and comprehensive concept of BI, and the following is a review of some of these concepts:
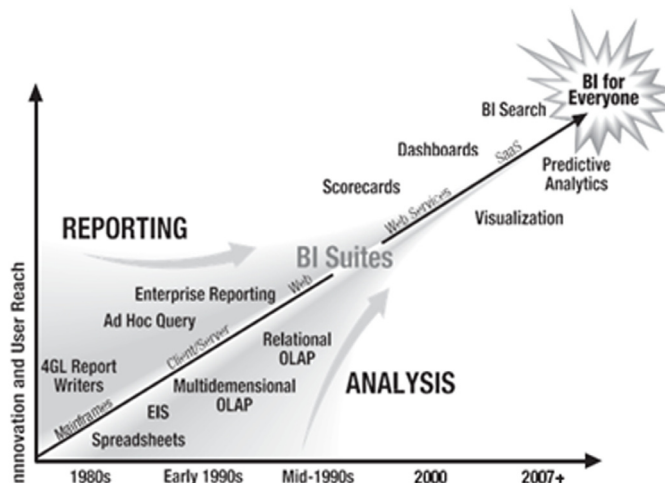
1. BI is a set of the processes and technologies necessary to transform data into information and information into knowledge, and knowledge into actions which in turn drives organisations towards lucrative business and creates value. The BI concept includes using databases, data warehouses, data integration tools, business analysis tools and knowledge and content management collected under one umbrella of BI architecture (Moss and Hoberman, 2004, p.3).

2. The leading organisations in the field of computerised systems have contributed with a set of concepts to define BI, and the following definitions come from some these organisations:

   a *IBM*: BI is an umbrella term that covers a wide range of the processes involved in the extraction of valuable information for end-users at the different levels from data blocks within various key departments.

   b *Gartner group*: BI is an inclusive term that includes the analytical applications, infrastructures and platforms, and the best practices and solutions to support decision-making.

   c *Business objects*: BI is a methodology used by organisations to provide administrative and operational support in order to analyse various data and convert it into useful information about personnel, customers, suppliers and partners to make more effective decisions (Chee et al., 2009, p.99).

In light of these definitions, Turban et al. (2011, p.28) have discussed their concept of BI as a comprehensive term which combines several architectures, tools, databases, data warehouses, analytical tools, applications and methodologies and integrates them into unified software. This concept refers to free expression, because it means different things for different individuals. Additionally, the confusion about the BI concept lies in noise caused by the acronyms and buzz words that are related to BI concepts such as Corporate Performance Management (CPM).

The concept of BI is similar to that of most other concepts in terms of the history on which it was made. Figure 1 illustrates the set of stages depicting the historical development of the architectural systems of BI. These historical stages depend on the study of the integrated Information and Communication Technologies (ICT) and its use by end-users in order to accomplish their tasks. Here, the crucial point which must be kept in mind is that evolution in Systems and Solutions BI was accompanied by a highlighting of the need

Source: Howson (2008).

Figure 1　The historical development of the architectural systems of BI

to developing HC who could work on implementing and using these systems and solutions.

HC in light of two evolutionary stages of BI

This paragraph discusses some evolutionary milestones around BI in the light of one of the most important environmental elements that governs the data and information management which is the investment in HC that is owned by organisations. We will note how HC contributes in operating and building the BI Solutions used by organisations in order to create the values attached to their activities.

The early stage of end-user computing

The complex field of information technology (hardware, software and its acronyms) and communications technology forced end-users to be more widely aware of the various and diverse technologies in order to accomplish required tasks. Note that the required tasks were limited both in processing data and creating reports of information or even in discovering new knowledge.

Many years ago, end-users would have waited for a long time to learn and understand how to use various computing tools in performing their work, such as programming (central programming, websites and distributed workstations) by using these tools. Therefore, the idea of these applications revolved around how to get data by using a computer from outside the organisation and relying on information and communications technologies, which was the core idea for the majority of end-users in completing their works (Chen et al., 2008, p.35).

In this stage, the first tools used in the query and reports were based on programmers' self-solutions. In the mid-1970s, software vendors began providing the software tools to help computing, which in turn allowed for non-programmers to navigate the huge sea of data in order to analyse and report. Thus, these software vendors are committed to a set of assumptions that describes the general lines as a development of HC. One of these assumptions is that there is an agreement among end-users and technical staff in orientation towards the end-users computing, such as to make use of the processing logic in systems analysis and design which in turn facilitates

the process of using computing tools. One of the most important reasons that make these software vendors adhere in their orientation towards the adoption of the end-users computing is to give end-users the ability to generate their own data and put it into the optimal model to extract information. For this reason, the end-users have become able to build their databases easily (Clark, 2008, pp.2274–2277).

At end of this stage, business organisations tried to invest in their HC by supporting end-users in the use and development of computing tools through training their employees; this resulted in the acquisition of new capabilities that enabled them to learn to accomplish diverse businesses.

Stage of information centre

In the beginning of the 1980s, Information Centres (IC) emerged as a modern concept, while the idea of the end-user evolved very slowly. At this stage, we refer to a missing link in building Information Systems within organisations, which is the weakness in the ability of these organisations to choose the necessary and appropriate tools and skills. This is a good reason, therefore, to emphasise the idea of ICs. In addition, the very limited numbers of end-users was one of the reasons behind the emergence of IC. The idea of IC was based on going to a central location and getting help with regard to information and knowledge about the functions and activities of an organisation. IC therefore became a centre of the life of all aspects of the organisation as well as cutting the end-users' learning curve (Rasmussen et al., 2002, p.4).

IC as a traditional form has also become a central organisational structure to support the main departments in organisations. Organisations use IC to invest in their individual's analytical skills by encouraging use of the ICT in order to provide a wide range of services to end-users. ICs work as liaison among employees in the main departments on the one hand and programmers in these centres on the other hand (Chen et al., 2008, p.35).

In the light of developing HC, ICs provide invaluable assistance for employees in order to learn the right skills in using the tools and technologies that support their organisations. ICs' functions lie in the accurate identification of the site of the data and how to retrieve it, as well as determination of the recommended tools for its use, together with

training. ICs also provide continuous support to end-users through the development of integrated HC, including analytical and technical skills for individuals (Biere, 2003, p.13).

BI competency centres and their role in organisations

Management of BI initiatives and solutions need specific organisational structures in order to assist organisations in getting the right data and information as well as delivering these to the right people in good time. In particular, the existence of innovative organisational structures such as the BICCs that are concerned with planning and implementing BI initiatives and solutions reflects on growing the importance of investment in HC as component in these structures. These structures work to achieve sustainable competitive advantage by employing Business Intelligence Initiatives and Solutions through the role of HC in the success of those initiatives and solutions that serve their outputs to improve the organisational performance.
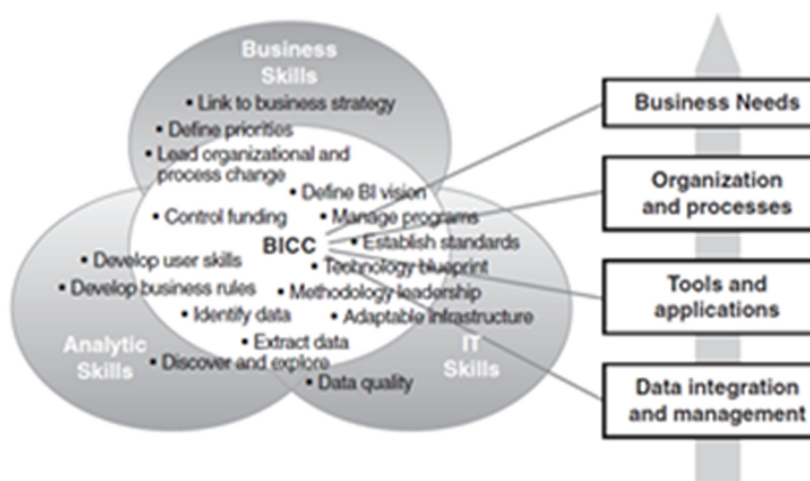
Smart organisations that use BICCs to achieve their objectives and strategies will be more capable of predicting future changes in economics and markets. BICCs will enable organisations to own the ability to adapt and grow under the new conditions of economics and markets to promote a culture of innovation and adaptation (Turban et al., 2011). Therefore, the next section will discuss the importance of BICCs' role within organisations.

The concept of BICC and the reasons for its establishment

BICC is defined as a multi-functional team that works within a formal and permanent organisational structure which has a wide range of tasks, roles, responsibilities and processes that support and promote the effective use of BI solutions across the organisation. These centres are interested in guiding the use of BI solutions throughout the organisation, as well as making it fully available to all end-users at different levels. In addition, BICC works to provide advice and support to end-users through answering all questions related to the BI solutions and providing assistance to explain information and knowledge in order to generate the expected value (Miller et al., 2006, p.13).

Laursen and Thorlund (2010) discussed BICCs as informal organisational entities including a different set of the fundamental competencies, business and analytical skills and information technology skills (see Figure 2). BICCs serve as a platform for developing the solutions-based on BI architectures, as well as investing in the mix arising from these competencies and skills. This mix of HC in BICC is designed to make sure those analytical models at different levels affect the organisational performance through maximising revenue and reducing costs to achieve organisational objectives (Laursen and Thorlund, 2010, p.183).

Source: Miller et al. (2006).

Figure 2   The fundamental skills and capabilities for BICCs

BICCs enable organisations to integrate and coordinate existing efforts to end-users in the field of BI solutions towards reducing redundancy in data and information, as well as to achieve e-entrepreneurship. These central efforts of BICCs therefore assure organisations that actionable information and knowledge will be delivered and share it among different functional areas within these organisations so that all employees can benefit from it. BICCs are based on the idea of knowledge-sharing, enhancement of analytical skills and enabling business units to achieve strategic objectives and strategies. BICCs therefore allow organisations to acquire new skills and discover actionable knowledge, which helps in turn to drive creativity and innovation (Bogza and Zaharie, 2008, p.1).

Establishing a BICCs

The key rationale for investing in developing HC through BICCs can be identified by the following five points (Howson, 2008, p.157; Miller et al., 2006, p.13):
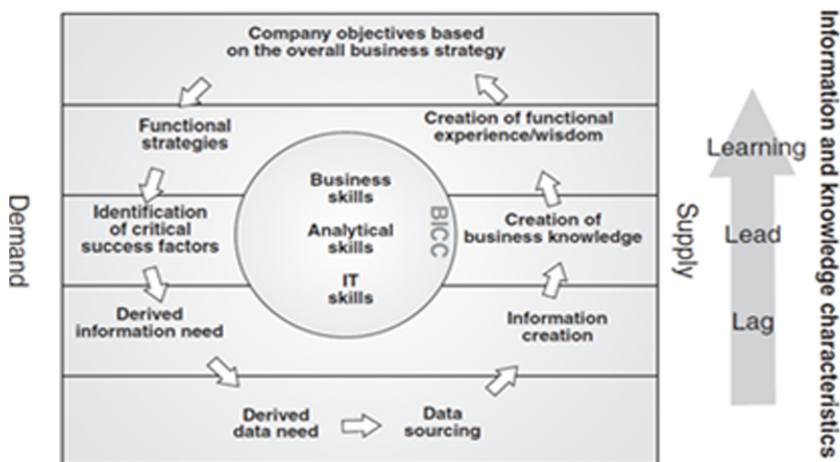
- Maintain and exploit the whole value of investments in BI solutions.
- Integrate and consolidate the initiatives of BI with Business Processes.
- Reduce overall risk to manage BI projects.
- Support end-users to fully understand all data as well as enable them to take appropriate actions based on the advanced analytics.

- Ensure that knowledge of BI (BI values, concepts and technologies) is shared across the organisation.

Thus, BICCs will lead to document organisational success, as well as the measurement and monitoring of the continuous improvement in performance. This continuous improvement can be achieving by implement BI systems to streamline operations, reduce costs and consolidate diverse information sources to increase efficiency. Figure 3 shows the main functions of these centres represented by an information management wheel.

HC in BICCs

Investment in HC is necessary in order to manage BI initiatives, and is one of the critical factors to achieve organisational goals and strategies. Therefore, BICCs represent the investment necessary to develop HC. These centres are not just another expression of support offices; their role is much broader than that and includes providing managers with the information and knowledge on which to base decisions, and the ability to use and interpret the results. The HC in BICCs work as translators; firstly, they translate business issues in information technology requirements, and secondly they translate the results to end-users who need actionable information and knowledge. Table 1 describes core roles for HC in BICCs.

Source: Laursen and Thorlund (2010).

Figure 3   The wheel of information: from demand to supply to support organisations

Table 1 A description of some core roles for the members of BICCs	
Core Roles	*Description*
BICC Manager	Promotes the value and the potential of BI in the organisation. Is responsible for ensuring that BI projects are aligned with corporate strategy and that they meet business requirements. Acts as a liaison between IT and the business. Establishes and monitors Key Performance Indicators (KPIs) for success of the BI strategy and for the work of the BICC. Manages the BICC, vendor relations and licensing; sponsors internal user groups and is responsible for metadata. Manages standards and templates for BI. Negotiates service-level agreements (between BICC and the business units).
Business Analyst	Understands the business rules and processes of the current organisation. Informs the project team about how data are currently used in the organisation and transformations or business rules that are applied to data. Provides support in understanding the information and further clarity in requirements. Acts as a representative of the business unit managers in day-to-day matters. Has a strong background in statistics, forecasting and optimisation and also has experience in applying these to business problems.
Chief Data Steward	Identifies issues and recommends initiatives to address data quality and data integrity. Manages cross-departmental initiatives to address data issues (i.e. defining data ownership, creating data quality improvement programmes with incentives, performing business metadata management). Develops and implements a data management strategy that ensures the delivery of information. Coordinates and guides the data stewardship committee and resolves data integration issues across business units. Monitors and reports on quality of data across the organisation. Promotes and advocates sound practices in the capturing, management, dissemination, manipulation and preservation of data to enable BI. Approves business naming standards in line with defined enterprise standards and develops consistent data definitions, standard calculations and derivations.
Technical Consultant	Ensures correct technical setup of BI solutions and advises the project team on any connectivity, security or technical requirements and related topics. Is responsible for the technical implementation of the project, for the project's metadata and for the technical overview of the project. Understands all technical aspects of the solutions, business systems, the BI software and the technical architectures, but also has some business skills. Provides second-level technical support for the BICC Service Desk.
Project Manager	Ensures that BI projects deliver business value. Manages the day-to-day direction and coordination of the project team and reports on the project status to the project sponsor. Integrates new business changes and ensures alignment of changes to any affected systems if required. Also obtains organisational support and resources for the project (i.e. equipment, software, user accounts, office space, access passes, ID cards).

There are many other roles for human staff in these centres, including BI Specialist, Warehouse Architect, Administrative Assistant, Knowledge Officer BICC, Internal Communicator and others.

Source: Miller et al. (2006).

Yonis (2010, p.64) have identified eight basic responsibilities to HC, which can be summarised as follows:

- *Management of BI programmes*: BICCs work to managing BI programmes, which are oriented enterprise packages for a particular purpose. These centres also implement the development and management of project methodologies to define the business processes.

- *Consistency and Standards*: consistency among business processes and technologies, and

adherence with standards have become a requirement for organisations regardless of their size. Without uniform standards, different functional departments may develop their own methods, and will thus use multiple technologies or different processes, which may be wasted or unnecessary for organisations. Once again, this does not means that all departments should adhere to the same methods, but BICCs could be the adviser model for the development of special instructions for

specific departments, especially if there is a certain privacy for a department, and for the enhancement of efficiency.

- *Communicate*: the identification of business requirements and their translation in a technological implementation to BI Solutions. This step stops each entity in an organisation from adopting various methods of building their solutions independently. Communication can be made in various ways, for example, making BICCs responsible for all projects and developing them, or putting members of these centres in each team within each entity, or perhaps providing BICCs' support to the different entities in order to provide their requirements separately.

- *Training*: BICCs establishes the standardised systems for training at individual or public level. These centres can make their training directly to end-users or indirectly via training some members externally, or what is known as 'train the trainer', thus providing additional benefits to finding 'expert users' who will maintain an ongoing relationship with BICCs.

- *Support*: most BI Solutions depends on the same processes and technologies as well as the interaction with end-users. BICCs therefore support all of these entities by working to address problems, manage users' requirements and provide continuous processing.

- *Supervision of the data*: data are the focus of BI solutions. These data within organisation are often owned by the functional departments or technologies, which includes data-source systems and data stores such as databases and data warehouses. Thus, BICCs will be in charge of identifying data requirements to both functional departments and technologies.

- *Governance*: each organisation should have its own unique philosophy for BI solutions in parallel with its strategic direction. Therefore, BICCs should develop a governance structure to implement this philosophy where depending upon a central structure would provide a cohesive and holistic approach. Additionally, the establishment of stable governance is an important element, especially when there are several departments benefitting from BI initiatives.

CASE STUDY

A brief summary of the CCI at the University of Mosul

The CCI at the University of Mosul was established in 1972 when it was named the Electronic Computer Centre. It is one of first centres to be established in the northern region of Iraq. During a very short period, the CCI has become one of the most important centres through its progress to the top of the pyramid among the computer centres within Iraq, although its potential was modest at the time of its inception.

The CCI started by focusing on the dissemination of basic concepts regarding electronic computers within the university and the community in Mosul city. In that period, the CCI accomplished several doctoral and masters projects through its computer system (which is IBM 1130). In addition, in 1978, a Honeywell mainframe computer system was installed within the CCI.

A specialist staff within the CCI was one of the most important components of the centre's success and its continuous work over the years. These staff members, as HC, contribute to building the potential of their end-users through training and counselling inside and outside Mosul University. Through its HC, the CCI has become a shining star in the sky of Arab Universities' computer centres, consisting of the various departments and disciplines besides its ownership of a network of computers with special potential. At the beginning of the use of computers in business organisations, the CCI started with dissemination of personal computers within the university and it became a consultative centre at Mosul University through its specialist, highly efficient staff. At the end of the 1980s, the CCI became dependent entirely on the personal computers and networks.

The CCI has a building in the middle of the campus at Mosul University. This building consists of three floors and is furnished through foreign bodies for all its requirements, from the cooling system and fire detection to the specialised devices and equipment that is necessary for its work. But as is well-known, the last war suffered by Iraq had a significant effect on the work of the CCI.

On 11th April 2003, the CCI was subjected to total destruction and was burnt out completely. When work resumed, the management of Mosul University provided support for the

reconstruction and rehabilitation of the CCI so that it could become better than it was in the past. This support included a processing centre with specialised staff in computer science (hardware, software, communication systems and networks), besides the other support disciplines, in order to promote the CCI and achieve the desired goals. Figure 4 illustrates the organisational structure of the CCI at the University of Mosul.

The development of HC through the CCI

The development of the analytical and technical capabilities of the personnel at the University of Mosul within its colleges, departments and research centres is only part of the success in achieving the vision of the university. This is particularly related to the strategy adopted by the CCI. The CCI's *vision* is "to play its role as a service efficient centre which provides innovative services for information and communications technology

to achieve the aspirations of the university and society". The centre has a *mission* which is

"committing to providing the requirements of information and communications technology through the activities in the field of academic computation to create a wide base to work, which has the responsibility of improving information and communications technology for development, training, research, and consultation, besides the focus on the quality bases related to this improvement."

Its *goal* is to:

● Provide services for information and communications technology in the university so that it becomes a centre for developing software and applying new techniques to increase the efficiency and experiences of those who work in the field of information and communications technology in the community of the university.
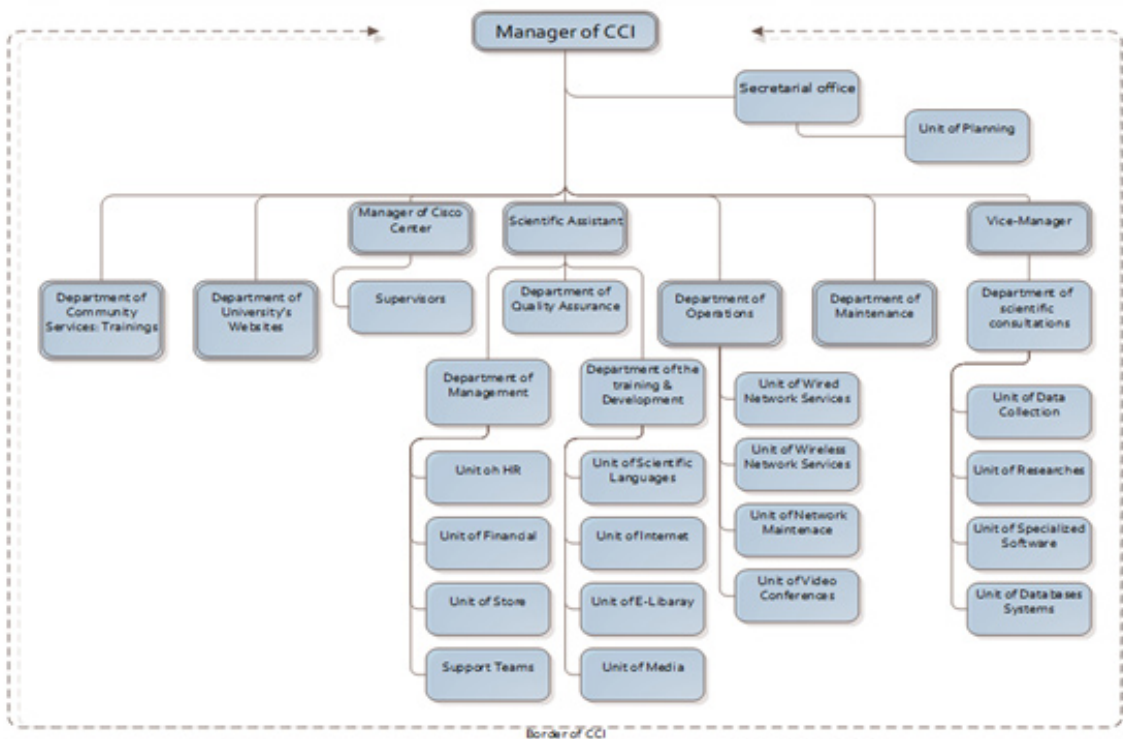

Figure 4   The organisational structure of the CCI

- Plan, implement and develop the informatics infrastructure especially at the University of Mosul.
- Establish relationships of cooperation with international companies to bring home the latest information and communications technology.
- Cooperate with the colleges and provide them with informatics technologies and services in the framework of the entrepreneurial projects and society services.
- Develop the experiences of employees in the governmental sector at Mosul City in the field of information and communications technology.
- Automate the accounting and office business to increase accuracy and save time and effort.
- Eliminate computer illiteracy through the provision of training courses on how to use computers and their different applications.

As far as the needs of colleges, their scientific departments and research centres at Mosul University are concerned, in order to develop the analysis and thinking skills of their employees, the CCI has adopted strategies for teaching the different concepts related to the skills of information and communications technology and employing them for the service of university society.

This is done through the process of regular training and development through sophisticated methodologies (see Figure 5), taking into consideration frequent reviews of the levels of training and development of end-users. These courses are invaluable and in turn ensure the development of strategic HC in the university community who are capable of performing its duties effectively and efficiently.

The CCI has been a pioneer in offering many training courses in different computer fields to get rid of computer and internet illiteracy. These courses include:

- Operating systems and applications software.
- Various programming languages.
- Courses in computer networking, communications systems and network operating systems.
- Offering many basic and advanced courses for the internet network and its services, and advanced maintenance courses.

In addition to the training courses, the centre offered courses for the scientific promotion of faculty members at Mosul University and gave them certificates on passing. Moreover, the
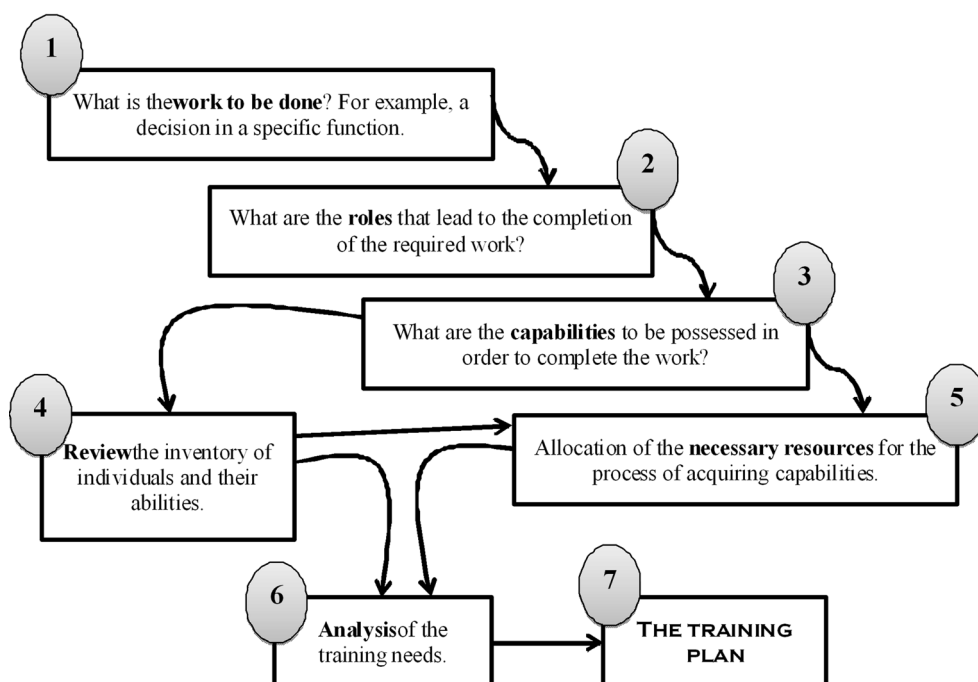

Figure 5   The training methodology of the CCI

reception of students for summer training in order to be prepared for field labour were also involved in the specialised courses in order to gain scientific and functional experiences and skills. After introducing the IC3 certificate to those applying for graduate studies, the courses in IC3 were offered by the CCI for MSc and PhD applicants. The CCI has also produced specialised IC3-awarded staff who helped to train the students.

Specialised staff designed the curriculums of courses at the CCI, including specialised professors in addition to training staff holding BA degrees, who have excellent experience in the field. The centre also uses six labs with the most up-to-date computers loaded with the latest editions of training software programmes. The centre uses the latest techniques for viewing data. The labs are supplied with the newest furniture and appropriate air-conditioning sets.

In light of developing HC, the CCI completed 112 training courses in 2011 to technically develop the HC at Mosul University in subjects related to computer systems, communication systems, networks and maintenance. In addition, the centre provided several technical and scientific consultations in the field of computer applications. It also built different computer systems to support the work of administrative units in colleges and research centres. For example, when requested, one of the colleges built a specific system and new reports from its information systems. The CCI works as an efficiency centre in order to provide a study to evaluate and analyse the impact on the environment of those systems (the architecture of Business Dashboards, for instance, at the college of administration and economics). The centre provides the required design concepts and also the requirements for achieving that design. Specialised individuals in the CCI will design and implement the programming processes for inquiries and queries for the proposed system to complete the reports required from the colleges.

These processes are performed inside the CCI at the department of scientific consultations. The data and information are then checked for validity and to ensure they are appropriate for the intended purpose through a discussion between the college and the CCI. If there was a mistake in the design processes, the programming orders and data sources would be checked again at the CCI. The final design of the required reports uses elements of the new data. Figure 6 shows these processes.
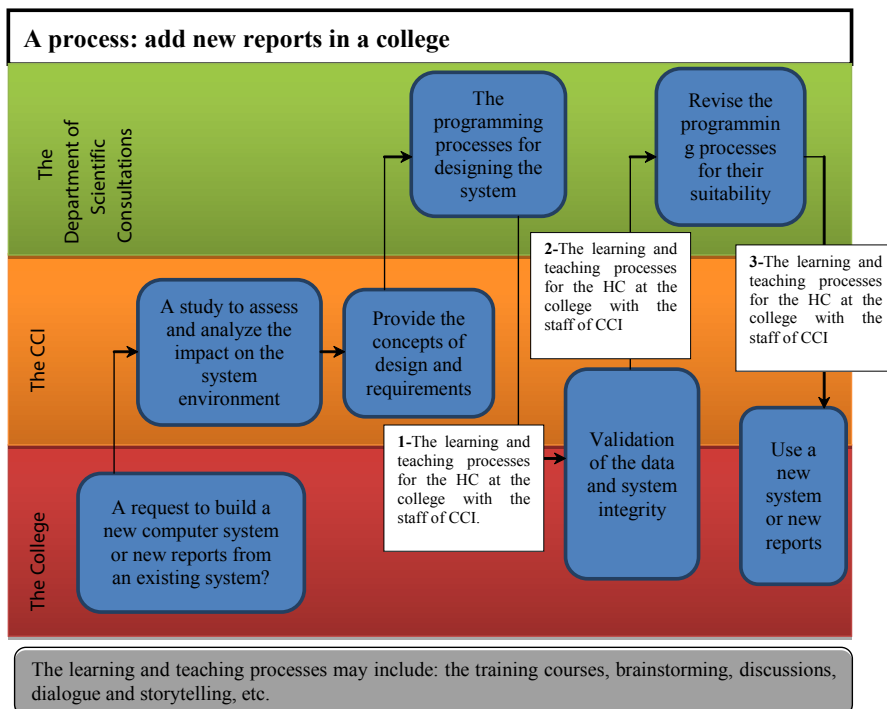

Figure 6   The learning and teaching processes for the development of HC in the university community

CONCLUSIONS AND SUGGESTIONS

Although BICCs are organisational structures for excellence, especially in addressing many tactical issues efficiently and effectively, we have to consider the strategic role that these centres play in building and developing technical HC for business organisations.

Therefore, the primary investment in BICCs is a fundamental issue which should be studied carefully. This study is done through understanding the roles and responsibilities of these centres and to what extent the work units and functional departments are in need of developing strategic HC, particularly regarding the technologies of BI and the tools for data integration. These technologies and tools help to develop the organisation capability to smartly and quickly respond to the opportunities and threats in the work environment.

One of the issues that we highlight in this research paper is that BICCs do not only improve the creative and innovative power of HC, but also facilitate certain creative experiences to support the organisations so that they are able to face their highly dynamic environments. These experiences are limited without these centres. An example of this issue is the support of the centre in generating electronic brainstorming about a problem for a group of managers in the top level of management.

BICCs represent the first connection point in any organisation regarding queries or problems related to the strategy of developing technical HC. These centres therefore provide the optimum support for managers at different levels in the organisation and their teams that are spread both inside and out.

Finally, we indicate that business organisations are in need of adaptation to survive and succeed. To achieve this, they should encourage their individuals, work groups and teams to learn for the purpose of generating and sharing knowledge. Here, BICCs design and implement a strategy to build the knowledge base and share its content (learned lessons and best practices) to achieve as much efficiency and effectiveness in HC management as possible. We notice these considerations at the CCI, which now serves the university community consisting of 25 colleges and six research centres, which in turn contain more than 4200 members, and more than 790 male and female students in higher education.

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BIOGRAPHICAL NOTES

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