Competency Mapping as an Aid to Sustainable Human Resource Management

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ABSTRACT

Organizations in the modern days are undergoing heavy transformation in the wake of industrialization and globalization. At the same time problems like attrition, absenteeism, and low productivity of the employees are getting bigger. Hence it has become imperative to adopt a sustainable human resource management strategy. Consequently, organizations are giving more thrust in understanding and developing the competency of employees. Competencies not only include behaviour and knowledge that demonstrate excellent performance but also include "applied" knowledge or the behavioral application of knowledge that produces success. Appropriate knowledge of the competencies of people can help managers put him/her in the right job thus ensuring high performance and job satisfaction of the job holder. Hence, the main objective of the paper is to revisit the concept of competency mapping and describe its role in sustainable human resource management.

Keywords: Competence, Competency, HRM, Sustainability

Introduction

In today's fast changing and global market place, companies are constantly striving to find ways to become and to stay competitive. Traditional sources of competitiveness, such as production capabilities. financial re-engineering, raw materials, distribution of resources, and technology have seen a slight shift towards the realization of people related components, the newborn architecture of the company. One key strategy that is used to assist a fast growing client to increase internal flexibility and competitiveness is the application of the skills based on competency approach to human resource management. A competency is essentially the unique capability, knowledge and behaviour that provides a company the prospective source for development. As "we do live in a world in which knowledge, rather than physical capital, is significant, we need smart people who can do great things--increase productivity, build new products and services--and do so even more quickly" (O'Reilly & P feffer, 2000). Researchers emphasize on the role of employees for achieving enterprise goals (Boudreau, 1997; Baird & Meshoulam ,1988), by saying that employees are the most important enterprise asset (Quinn, 1992; Mayo, 2001), and human capital represents the only sustainable source

of competitive advantage (Hamel and Prahalad, 1994; Pfeffer, 1994; Spencer, 1995; Boudreau, 1996). In other words, "the biggest, most valuable asset of any company is its people, because all management plans for success enhancement are carried out, or fail to be carried out, by people" (Darling, 1999). Moreover, in a world where "all work is knowledge work and intellectual capital is crucial for economic success, it is logical that the ability to attract, retain and use the talents of people provides a competitive edge" (O'Reilly & Pfeffer, 2000).

Consequently, human resource management practices now have taken long strides by moving out of the background into the mainstream organizational strategy and management. It has also been realized that human resources practices cannot be generalized across organizations and given vent to the emergence of the term Human Capital Management. Now human beings are considered as human capital and sustainable utilization of this capital can give an organization competitive advantage.

Organizations in the modern days are undergoing heavy transformation in the wake of industrialization and globalization. As a result, organizations are giving more thrust in understanding

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and developing the competency of employees and use the tool of competency mapping, for the improvement of productivity and in maintaining a positive work culture. This application of the competence approach covers the operational areas of human resource management in the organization viz., selection, remuneration, vocational training, evaluation and promotion. The objective behind this effort is to identify the best, better and good and average effort on the part of the individual workers and support the best effort, encourage the better effort, empower the good effort and train the average effort of the workers to facilitate the best performance.

Concept of Competency

The history of the emergence of the term competency can be traced back to mid nineteen fifties. A team of educationalists lead by Benjamin Bloom in the USA in mid fifties laid the foundation for identifying educational objectives and thereby defining the knowledge, attitudes and skills needed to be developed in education. Then in the 1960s, David, McClelland, the famous Harvard Psychologist, has pioneered the competency movement across the world. The turning point for competency movement is the article published in American Psychologist in 1973 by McClelland which revealed that traditional achievement and intelligence score may not be able to predict job success, and what is required is - to outline the exact competencies required to perform a given job effectively and measure them using a variety of tests. The work done by Douglas Brey and his associates at AT&T in the US where they presented evidence that competencies can be assessed through assessment centre and it can be predicated to some extent based on the job success (cited in Lucia & Lepsinger, 1999; McClelland, 1973).

The term 'competency, as is used and defined in the literature always is confused with another term 'competence'. Hence, it is imperative to understand the subtle difference between these two terms before any further discussion. 'Competence' means a skill and the standard of performance reached while 'competency' refers to the behaviour by which it is achieved. In other words, one describes what people

can do while the other focuses on how they do it. Competencies dominantly compare general description of the abilities that are necessary to perform a task effectively. It may relate to the routine works, non-routine works, team efforts, control, coordinating and guiding workers, and allocation of resources, analysis, diagnosis, design, planning, execution and evaluation.

Further, competence can be defined as "the employee's capacity to meet (or exceed) a job's requirements by producing the job outputs at an expected level of quality within the constraints of the organization's internal and external environments." (Dubois, 1993). Whereas, competency as defined by Boyatzis (1982) is "an underlying characteristic of the person, which could be a motive, trait, skill, aspect of one's self-image or social role, or a body of knowledge which he or she uses". Some other "person based competencies" include self-confidence, creativity, and cognitive capacity competencies etc. However further discussion will be on competency not on competence.

Competency is "a cluster of related knowledge, attitudes, skills and other personal characteristics that affect a major part of one's job, correlates with performance on the job, can be measured against well-accepted standards, can be improved via training and development" (Parry, 1998). A competency is what a successful employee must be able to do to accomplish desired results on a job. Competencies are built up over time and are not innate. It typically takes experience on the job to build competencies. Knowledge, Skills and Abilities (KSAs), by contrast, might be brought into the job by entry-level employees.

A competency is the capability of applying knowledge, skills, abilities, behaviour and personal characteristics to successfully perform critical work tasks or specific functions, or operate in a given role or position. Personal characteristics may be psychological / intellectual / cognitive, social / emotional / attitudinal, and physical/psychomotor attributes, necessary to perform the job (Dubois, 1993; and Lucia & Lepsinger, 1999). Boyatzis (1992) and Fogg (1999) extend this definition to include both internal and external constraints.

environments, and relationships related to the job or occupation. Motivations and perceptions of the work and ones self or talent are also viewed as influential in competently and successfully performing a job in a position (Boyatzis, 1982; Fulmer & Conger, 2004; Gangani, McLean, & Braden, 2006; and Sandberg, 2000).

Rothwell (2002) explains that there are core competencies that are required of all workers. This would include knowledge, skills and abilities (KSAs), as well as soft skills or behaviour (Lucia & Lepsinger, 1999). Rothwell (2002) categorizes the core skills further by describing foundational and intermediate competencies. Competencies are also context specific (Boyatzis, 1982; Delamare LeDeist & Winterton, 2005; Youn, Stepich & Cox, 2006). Some competencies are more important or essential than others for a position or for the competitive advantage in the company.

Organizations aimed at competency based management, maintain the competency profiles of employees which are the synthesis of skills, knowledge, attributes and values, and express performance requirements in behavioral terms. The review of competency profiles helps managers and employees to continually reassess the skills and knowledge needed for effective performance.

Competency Mapping

Competency mapping is a process through which one assesses and determines one's strengths as an individual worker and in some cases, as part of an organization. It generally examines two areas: emotional intelligence or emotional quotient (EQ), and strengths of the individual in areas like team structure, leadership, and decision-making. Large organizations frequently employ some form of competency mapping to understand how to employ the competencies of strengths of workers effectively. They may also use competency mapping to analyze the combination of strengths in different workers to produce the most effective teams and the highest quality work.

Many employers now purposefully screen employees to hire people with specific competencies.

They may need to hire someone who can be an effective time leader or who has demonstrated great active listening skills. Alternately, they may need someone who enjoys taking initiative or someone who is very good at taking direction. When individuals must seek new jobs, knowing one's competencies can give one a competitive edge in the job market.

Competency models are developed through a process of clarifying the business strategy and determining how the models would be used (e.g. recruitment and selection, assessment, performance management, training and development, and career development). Then, data is gathered by structured interviews, analyzed and used to develop models of success criteria. Then, validation surveys are administered and models are refined, based on the feedback. Finally, models are finalized and translated into appropriate end-user tools and applications.

Sustainable Human Resource Management

The term sustainable development implies meeting the needs of people today without compromising the ability of future generations to meet their own needs. Sustainable development therefore involves: (1) A broad view of social, environmental and economic outcomes; (2) A long-term perspective, concerned with the interests and rights of future; (3) Generations to come as well as people today; (4) An inclusive approach to action, which recognizes the need for all people to be involved in the decisions that affect their lives.

In an organization, sustainable development is not just the responsibility of environmental specialists or communications professionals. It requires contributions from people across all functional areas of an organization including human resource management functions. Engen & Di Piazza (2005) in their seminal work "Beyond Reporting: Creating business value and accountability" have put some light into the concept "sustainable development in organizations". Table 1 explains how different functions of the organizations can contribute to sustainable development.

Table 1. Mapping Accountability: Five Functional Roles and Potential Business Benefits from Connecting them.

Who is accountable	Supply Chain Management	Human Resources	Product development/Sales	Finance	Public/Corporate Affairs
Accountable for what	Risk Management Product Responsibility	Employee recrultment and retention	Competition Product Responsibility	Fiduciary Responsibilities Reputation	Reputation
To whom	Management Suppliers Standard Setting Bodies NIGOs Competitors	Management Employees Wider Business Community Institutions Regulators	Corporate Affairs International Agencie Regulators Competitors Customers Media NGOs	Shareholders Finance Directors Management The Market Competitors Investors Shareholders Assessment Bodies Regulators	Management Employees NGOs Advisory Panels Competitors Wider Business Community Institutions Regulators
Through what mechanisms	Greater role in strategy Audit Training Standards/ Monitoring/ Compliance Establishing working relationships	Peer learning Training and development Creating culture amongst employees Leadership	R&D Stakeholder Intelligence (Customer feedback, benchmarking)	Analysis Investor surveys Annual General Meetings (AGMs) Disclosure	Connecting business functions and management with stakeholder concerns Relationship building
Cross-functional Connection	Sales Marketing Corporate Affairs Product Development	Corporate Affairs Marketing	PR Marketing Corporate Affairs	Public/Corporate Affairs Marketing	All functions and units
Vith what utcomes		Use social accountability as a marketing tool	sustainable products	Meet broader flductary responsibilities	Raise company profile

Source: Adapted from "Beyond Reporting: Creating business value and accountability", (Engen, T, and Di Piazza, S, 2005)

It can be predicted that sustainability becomes the next big topic for Human Resource Management after internationalization and globalization. Sustainable HRM implies attracting, developing and retaining highly qualified human resources over time that can help the organization to cope up with paradoxical tensions. Companies which aspire to achieve sustainable growth can only reach this goal if the people within the company have sufficient qualification and willingly work to support these corporate goals. In the long term the decisive factors

which can fetch success in the global market are not just the products and their quality, but also include the skills of employees. Therefore, companies must use sustainability as a 'deliberate strategy' for HRM.

Competency Mapping for Sustainable Human Resource Management

The main objective of this paper is to bring out how competency mapping can be an aid to sustainable human resource management. In fact HR managers have often struggled to introduce sustainable development within their organizations. For example, How should they integrate these issues into programmes for recruitment and staff development, and how can they use their knowledge of the business to bring critical issues to the attention of senior management? To solve such issues some researchers have highlighted specific competencies of managers who are active in sustainable development.

According to Mike Peirce and Katherine Madden, skilled people are becoming business' most valuable resource, and a sustainable development perspective may prove to be a vital component in a leader's set of competencies. It has been identified that people having competencies like strong awareness of social and environmental issues may contribute to

sustainable development. Some HR managers believe that these individuals possess a powerful understanding of the challenges which business is facing today, and frequently command the skills to engage with a wide diversity of institutions and people including other businesses, governments, universities and not-for profit organisations, as well as crossfunctional teams in their own companies. Here lies the value of competency mapping (see briefing by Mike Peirce and Katherine Madden).

Sustainability skills involve, being able to manage the interaction between sustainability and other organisational functions and priorities, and integrating sustainable considerations in such a way that they become part of an organisation's work at a

Table 2. Sustainable Development Competencies (The University of Cambridge Programme for Industry's (CPI) Competency Map)

Competency Theme	Competency Element	Understanding (Know-what)	Experience (Know-how)	Attitudes	
		Essential knowledge and skills (know-what)	How understanding is translated into practical action (know-how)	Personal values and Ways of Working	
Strategy Sense-making and planning	External Connext	Understanding the local and global context in which your organisation operates, including the most significant opportunities and risks that it faces.	Prioritising issues in terms of the level of opportunity and risk they present to the organisation, now and in the future.	Broad view: The importance you attach to balancing environmental, social and economic value.	
	internal Focus	Understanding how your organisation can respond to the opportunities and risks for greatest business and social value.	Formulating strategic objectives that address the organisation's opportunities and risks, supported by business cases, resources and champions to put them into practice.		
Stakeholders Managing relationships	Stakeholder Approach	Understanding why a stakeholder approach is essential to your organisation's long-term success.	Determining who your stakeholders are, how the organisation affects them, and what they think about the organisation.	indusive approach: The importance you attach to responding to the needs and aspirations of all people affected by your activities.	
	Dialogue and Partnership	Understanding how to engage with stakeholders in order to foster co-learning and build effective relationships.	Engaging in dialogue with stakeholders and responding to their legitimate concerns in a transparent and effective fashion		
Creating Channe	tearning	Understanding the competencies you need to help your organisation deliver its strategic objectives.	Developing and participating in learning and development processes that support the organisation's strategic objectives at personal and team levels.	tong-terin perspective: The importance you attach to recognising the interests and rights of future generations.	
	Action	Understanding the most effective approaches to influencing others and creating change in your organisation in line with its strategic objectives.	Demonstrating personal commitment to the principles and values of sustainable development, encouraging and enabling others to make this a focus of business action.		

Source: Adapted from a briefing note by Mike Peirce and Katherine Madden (available at http://www.cpi.cam.ac.uk/pdffFHR briefing.pdf)

strategic, as well as an operational level, rather than being viewed as an 'add-on'. Forum for the Future has identified a list of characteristics for leadership in sustainability. These are as follows: (a) Challenging the Status Quo: Creating impetus for change for sustainability by encouraging innovation and challenging others to think differently; (b) Partnerships: Creating strategic networks and alliances based on collaboration; (c) Consultation: Engaging in dialogue and balancing competing demands of stakeholders; (d) Futures: Using strategic insight to create a broad vision balancing economic, social and environmental factors; (e) Communication: Inspiring others and capturing their imagination, utilizing the power of the media and communicating by example; (f) Empowerment: Mobilising others by building capacity and developing their awareness of sustainability; (f) Integrity: Providing a transparent values proposition aligning actions and words; (g) Understanding Complexity: Demonstrating an awareness of the interdependency of systems across society; (h) Adaptability: Being able to adapt approach in the face of challenges.

In the line of identifying the sustainability competencies the University of Cambridge Programme for Industry's (CPI) Competency Map is a simple and robust model. This lists a long array of core competencies that are required by people to integrate a sustainable development perspective into their work (see Table 2).

To have a sustainable HRM system, the sustainable competency concept can be introduced into the competency based HRM. Competency based HRM aims at aligning peoples' competencies with organizations competencies. And the competencies are managed at different levels viz. strategic level and operational level. The following sections explain how competency mapping can be implemented in different areas of HRM. It is also discussed how sustainability concept can be introduced in a competency based HR System.

Recruitment and Selection

Companies can only succeed in the long-term if they recruit and motivate people who are able to respond to and shape the challenges of the future. These are the individuals with the capacity to create competitive advantage from the opportunities presented by changing markets, with the desire to learn from customers, consumers, suppliers and colleagues, and who possess the ability to build and influence long-lasting and effective partnerships.

Competencies can be used to construct a template for using in recruitment and selection process. Information on the level of a competency required for effective performance would be used to determine the competency levels that new hires should possess. Depending upon the accepted definition, competency data may take the form of behaviors, skills, abilities and other characteristics that have been associated with effective job performance.

Training and Development

Using a competency model as the basis of training and development system helps to avoid a short-term perspective and ensures that the system focuses on the right things rather than the latest things (Davis, 1996-97). Further this model focusses on relevant behaviour and skills. Since it helps the people to better assess their current capabilities and determine the behaviour they need to develop and to improve their effectiveness. It ensures alignment of training and development by ensuring proper competencies that are essential to the success of the organization. It makes the most effective use of training and development by increasing the likelihood that relevant skills will be applied and reinforced through experience on the job.

Training in social and environmental dilemmas builds skills which are relevant in many situations from leadership and team-working, to negotiating and problem-solving. A sustainable development perspective tells the way in which people think and act in critical business areas. A model on sustainable development competencies can help the organization in the aforesaid aspects vis-à-vis ensuring sustainable development.

Succession Planning

For succession planning there is a need for a list of the positions under consideration, agreement among the decision makers about what is required for success in each position, who is ready and why, who will be ready soon, accompanied by the person's development needs and recommended actions to close

the gap. Succession planning process identifies and develops individuals who are believed to have the potential to fill specific and senior positions.

Competency model helps in succession planning in various ways. It helps to define the abilities that are necessary to fill the role and also that behaviour that is strong predictors of success. It provides a method to assess candidates' readiness. It focuses on training and development plans to address missing competencies. It allows an organization to measure its bench strengths. Hence, this model would help in getting future leaders, having sustainable development competencies who will be capable enough to grow the business from a sustainable perspective.

Rewards and Recognition

Rewards and recognitions are the strategy to foster organizationally desirable competencies. In fact, employees are motivated by a complex mix of rewards. These ranges from financial security and bonuses to promotion and peer recognition and from taking on new challenges to making a difference to the things they care about.

Competency based pay refers to compensation for individual characteristics/skills and competencies over and above the pay for a job or organizational role itself commands. Individual characteristics that merit higher pay may come in the form of competencies (experience, initiative, loyalty and memory portability). One old fashioned way of improving employee performance is recognizing and rewarding his effort. Competency pay is the best way to do so. Rewarding employees for their ability to make the best use of their skills and competencies in accordance with the organization's needs was the logic behind this once popular HR tool. To ensure sustainable HRM, employee targets and incentives need to be aligned with the goals of sustainable development. Sustainable competencies can be fostered by identifying and rewarding such competencies. For example: giving people sustainable employee of the month award.

Performance Management System

"A sustainable development mindset pushes us to be better it encourages focus on performance, a

consistent eagerness to improve and continual learning." "We want an organization made up of inquisitive people, as we are seeking innovation, constant improvements in the way people do their jobs, in all areas of the business. Conducting business as usual does not culminate an inquisitive culture." (Annonimous; cited in the briefing by Mike Peirce and Katherine Madden). Thus, a performance management process that consistently measure and assess individual and group performance to accomplish such objectives of the organization and foster sustainable competencies is desirable.

Competency mapping process is designed to consistently measure and assess individual and group performance to accomplish the objectives of the organization and it further helps to fulfill the expectations of customers. It is used to identify key attributes (knowledge, skills, and behavior attributes) that are required to perform effectively. Competency mapping involves two sets of activities. One is related to the work activities and work process and the other is related to the individual and group performance. It is about identifying preferred behaviors and personal skills, which distinguish excellent and outstanding performance from the average performance in terms of attainment, ability and aptitude, or typical behavior in terms of motivation and temperament.

Competencies are critical behaviours demonstrated on the job and, as such, are often included as part of performance management. In a sustainable development perspective the key behaviour include strong awareness of social and environmental issues, a powerful understanding of the challenges facing business today, and ability to command the skills to engage with a wide diversity of institutions and people including other businesses, governments, universities and not-for profit organisations, as well as cross-functional teams in their own companies. Performance management is about achieving results in a manner that is consistent with organizational expectations and desired behaviors. Competencies provide expectations for "how" the job is performed, not just "what" gets done. Assessing competencies as a part of performance management is an important

means of assisting employees in understanding performance expectations and enhancing competencies on-the-job.

Conclusion

Keeping in view the increasing environmental concerns all over the world, business leaders along with others should join hands to solve such problems. It is needless to say that one of the major antecedents of global meltdown may be inadequate focus of business leaders towards sustainable business. Hence, after competency based HRM, the new buzzword is Sustainable HRM. Accordingly companies are getting certification for sustainable HR practices. In the Swiss Association for Quality and Management, all activities and processes which aim at the development and maintenance of staff potential are evaluated with respect to professionalism and sustainability. The fulfillments of all 'must' criteria results in the awarding of the Sustainable HRM label systems. It can be concluded that to survive in a turbulent and dynamic business environment, organizations have to adopt competency based human resource management practices, which are vital to productivity and performance excellence and also for a sustainable business.

Competency maps are industry specific, or more accurately, profession/role specific. On top of this, some competencies are considered generic and apply to all industries/professions. These include competencies such as leadership, communication, team working, etc. However, sustainable competencies can be generic in nature. Organizations should think how sustainable competencies can be measured, utilized and fostered within their respective premises.

References

- Baird, L., & Meshoulam, I (1988). Managing two fits of strategic human resource management.

 Academy of Management Review, 13(1), 116-128
- Berde, Cs. Piros, M. (2005): qualification and Human Resources Management in Hungorian Agriculture. Studies in Agricultural Economics, Bedapest, 2005. 17P.

- Boudreau, J. W. (1996). Human resources and organization success. CAHRS Working Paper No. 96-03. Ithaca, NY: Cornell University, School of Industrial and Labor Relations, Center for Advanced Human Resource Studies. Retrieved from http://digital_commons.ilr.cornell.edu/cahrswp/174.
- Buodreau, J.W. (1997). HR metrics and strategy.
 CAHRS Working Paper No. 97-21. Ithaca,
 NY: Cornell University School of
 Industrial and Labor Relations, Center for
 Advanced Human Resources Studies.
 R e t i r e d f r o m
 http://digitalcommons.ilr.cornell.edu/cah
 rswp/162 accessed on 14.07.2009
- Dalamare Le Deist, F. & Winterten, J. (2005). What is competence? Human Resource Development International, 8 (1), 27-46.
- Darling, J. R. (1999). Organizational excellence and leadership strategies: Principles followed by top multinational executives. Leadership and Organization Development Journal, 20(6), 309-321.
- Davis , R. S. & Olson, D. A. (1996-1997). Leverage training and development to make a strategic impact. The Journal (society of Insurance Trainers and Educators), pp. 10-12.
- Dubois, D.D. (1983). Competency based perform importance: A strategy for organizational change, Amhenest, MA: HRO Press, Inc.
- Flumer, R.M. & Conger, J.A. (2004). Identifying talent. Executive Excellence, 21(4), 11.
- Fogg, C.D. (1999). Implementing your strategic plan: How to turn "intent" into effective action for sustainable change. New York: American Management Association.
- Gagani, N., Mc Lean, G. N., & Braclen, R.A. A competency-based human resources development strategy. Performance Improvement Quarterly, 19 (1), 127-139.
- Lall, S. (2001.b). 'Competitiveness Indices and Developing comprise : an Economic

- Evaluation of the Global competitiveness Report', World Development, 29:9.
- Lucia, A.D., & Lepsingor, R. (1999) .The Art & Science of competency models :Pinpointing critical success factors in organization , New York:Pfeiffer.
- Man Sustainability Report 2005-6. Sustainable Human Resource Management. http://www.man.eu/MAN-Downloadgalleries/EN/Company/Environment/HRM.pdf accessed on 02.07.2009.
- Mayo, A. (2001). The human value of the enterprise: Valuing people as assets: Monitoring, measuring, and managing. London: Nicholas Brealey.
- McClelland, D. C. (1973). Testing for competent rather than for intelligence .American Psychologist, 28, 1-14.
- Merterns, Leonard (1997) Labour Competence: emergence, analytical frameworks and institutional models, Menterideo, Cinterfor/ILO
- O'Reilly, C. A., & Peffer, J. (2000). Hidden value: How great companies achieve extraordinary results with ordinary people. Boston: Harvard Business School Press.
- Pfeffer, J. (1994). Competitive advantage through people--Unleashing the power of the work force. Boston: Harvard Business School Press.

- Pfeffer, J. (1995). Producing sustainable competitive advantage through the effective management of people. Academy of Management Executive, 9(1), 55-69
- Poor, J, (2006): HR Mozgasban. MMPC, Budapest, 2006, 70.
- Rothmell ,W.J. (2002). The work place learner: How to align training initiatives with individual learning competencies. New York. American Management Association.
- Rothmell, W, & Wellins, R. (2004). Mapping your future: putting new compentencies to work for you. Training & development 58(5),94-102.
- Sandberg, J. (2000). Understanding human competence at work: An interpretative approach. The Academy of management Journal, 43 (1), 9-25.
- Schmidt, A. & Christine Kunzmann, C. (2007).

 Sustainable Competency-Oriented Human Resource Development with Ontology-Based Competency Catalogs. In Cunningham & Cunningham (eds). eChallenges 07. Den Haag.
- Spencer, L. M. (1995). Reengineering human resources. New York: Wiley
- Stalk, G.J. (1988). Time the next Source of competitive Advantage, Harvard Business Review, V66, n4, pp. 41-51.
- Youn Chyung, S., stepich, D., & Cox, D. (2006). Building competency-based curriculum architecture to educate 21st century business practitioners. Journal of Education for Business, 81 (6), 307-304.