



Journal of Internet Banking and Commerce

An open access Internet journal (<http://www.icommerceland.com>)

Journal of Internet Banking and Commerce, December 2017, vol. 22, no. 3

THEORETICAL ANALYSIS AND QUALITATIVE REVIEW OF THE MATHEMATICAL MODELING ON MANAGEMENT OF RESOURCES IN COMMERCE

KAMAL NAIN CHOPRA

Applied Physics Department, Maharaja Agrasen Institute of Technology,
GGSIIP University, Rohini, New Delhi, India,

Tel: 98182 35640;

Email: kchopra2003@gmail.com

Abstract

In the modern corporate world, for the human resource departments, the Resources Management and Sustainable Development have got the important place and role to play. The Theory and Modeling for these important ingredients of the successful policy makers in the state and the Business world have been presented in the analytical form. Modeling of the Sustainable Development in terms of Earth System, and the Level and Nature of Sustainable Development has been technically discussed. The Requisites of the Resources Management and Sustainable Development have also been described.

Keywords: Resources Management; Sustainable Development Theory and Modeling for the Performance Optimization; the Level and Nature of Sustainable Development; Life Cycle Analysis

© Kamal Nain Chopra, 2017

INTRODUCTION

The Resources Management and Sustainable Development are really very important, and that can be judged from the thinking of modern Research Experts [1,2] that is as: Energy management, water management, and sustainable development are all identified among “the great ‘macro themes of the century without solving which in the short term, life on Earth may become seriously jeopardized, or at least unpredictably complex. A very good book dealing with the subject was published a decade back, and still is considered as a very useful for the students learning this subject and also the business managers in the corporate world. The authors of this book have explained the nature of different types of knowledge, how knowledge-based competition is affecting organizations, and how these ideas are related to the concept of innovation and learning in organizations dealing with the various types of resources. Also, a very detailed description of the strategies and organizational structures and designs useful for facilitating the acquisition and development of knowledge, has been included. Besides, a very good account of the (i) continuous knowledge acquisition, (ii) the promotion of innovation among individuals and teams, and (iii) the method of fostering the creation of new knowledge, has been provided. Lastly the authors have explained (i) the process of learning the climate and culture for organizational progress, and (ii) the techniques of measuring and monitoring knowledge resources at the organizational level.

It is now well established that one of important types of resource management is the human resource management, in which the resource manager aims at strengthening the employer-employee relationship based on a variety of functions within the human resources department and throughout the organization. It is well known that in case of a small business, the human resource manager has a great degree of latitude, as well as the time to devote to employee interaction within a small manpower. Also, these elements are really important for succeeding as an effective human resources leader, although a number of functions have to be accomplished to achieve this goal. Another responsibility of the manager of the human resources department is ensuring that department employees have good knowledge of the latest advances and the requirements in their respective areas of expertise. They have to possess the expertise in the fields related to the compensation, benefits, safety, payroll, recruiting and training of the employees. Hence, the HR manager has to be an all-rounder of having the expertise of various parameters related to the human resources. His correct decisions save the corporate from lots of embarrassment.

Additional requirement of the HR manager is having the knowledge of federal and state employment and labor laws and regulations applicable to the human resources professionals. It is also important that the HR manager faces many challenges because of the technical changes. An effective and successful human resource manager has to be in constant touch and communication with the executive leadership, and has to understand the return on investment (ROI) in human resources activities as a contribution to the company's bottom line. This is easy in

case of the small business, but quite complicated in case of the big business. This is because of the fact that a smaller workforce can easily implement the methods and strategies possible for showing faster results, whereas in a large organization, the bureaucratic hierarchy generally puts many layers of authority between the human resource manager and the executive leadership, which results in passing through various stages. The sustainable development is the process of building equitable, productive and participatory structures, in a way that the economic empowerment of communities along with their surrounding regions is increased. Very good accounts of the topics of "Science for Global Sustainability: Toward a New Paradigm" [3], and "Sustainability and growth when manufactured capital and natural capital are not substitutable" [4] have been given in the literature. More recently, an interesting paper on "Energy, environment and sustainable development" [5] has also been presented. It is also very important to know that the Techniques of providing information on the Resources management (IRM) provide a lot of expertise on the (i) identification of information sources; (ii) type and value of information they provide; and (iii) ways of classification, valuation, processing, and storing that information.

We now understand the Sustainable Development as the means the Environmental, economic and social well-being for Brundtland Report. We can see that the Sustainable development is a way for us to use resources without the resources running out. This term used by the Brundtland Commission is as the development with sustainability meeting the needs of the present without compromising the ability of future generations to meet their own needs. We know that everyone wants a better place to live e.g., better homes and housing, while others want better schools, more jobs, better shops, or cleaner and safer streets. In general, we need a better environment, meaning green spaces, playing areas, nice gardens, decent houses, less noise and pollution. Also, the resources used should renew over generations, a better economy.

It is now increasingly been realized that if we are to tackle one issue, then we may probably have to tackle the others as well e.g. new shops can be opened only in an area where crime and poverty levels are very high; and to reduce crime rate jobs are to be made available.

In this manner, the Sustainable development is defined as the development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It is based on two key concepts: (i) the concept of needs, in particular the essential needs of the world's poor, to which the highest priority should be given; and (ii) the idea of limitations imposed by the state of technology and social organization on the environment's ability for meeting the present and future needs. For defining the sustainable development correctly, and accurately, it is necessary to see the world as a system; a system that connects space; and a system that connects time. This means that in the first case, any happening in any part of the world, affects the rest of the world. Also, in the second case, it implies that any decision taken by a state government at a particular time in

the past affects the state today, and any decision taken today will affect the state in future. For example, the practices followed by the earlier generations in a particular trade affect the practices followed by the today's generation, and the policies followed by the government on the economic reforms today, will affect the economic state of the future generations. Interestingly, the quality of life can also be considered as a system e.g. we have to enjoy good health, but only along with other important ingredients of good life like secure income, good education, and clean air environment today and tomorrow. The sustainability is based on the fact that human activities are dependent on both the environment and resources. This is because of the fact that health, social security and economic stability of the society are the indispensable and essential elements of life. At present, it has become more important than ever before, because the society is now moving from a consumer based society to a sustainable society.

PROPOSED MATHEMATICAL MODELING

The topics of Mathematical Modeling of Sustainability and Management of Natural Resources have recently, been extensively studied [6]. The Statistics branch of Operations Research. Is concerned with the system modeling and optimal decision making in a deterministic or stochastic setting, and especially deals with the problems frequently arising in the context of resource management, and portfolio selection, and provides a foundation in the mathematical tools of operations research, particularly optimization and stochastic modeling. The sustainable development in industrial organizations is also very important, which is related to the aspects: (i) it represents a global indicator of sustainable development in industrial organizations, dependent on partial indicators; (ii) it provides a method for the assessment of sustainable development in industrial organizations, for an estimation of their chronological evolution, or optimal accomplishment; (iii) the possibility of making various predictions, forecasts regarding sustainable development, on the basis of its values; (iv) performing comparative approaches to the functions of sustainable development of several organizations; and (v) it provides a mathematical solution to various optimization problems at the economic, social, and environment levels, of the purpose functions, occurring in the expression of the DDOI function by employing operational research methods, specific to mathematical analysis. fDDOI analysis can be approached by using the numerical methods referring to calculating certain functions by drawing up discreet value tables. Knowing the values of any function at some points of the definition interval, called interpolary nodes, any other function sharing similar values with f in these nodes, is an interpolary function for f . The increase in these values here refers to a sensible increase of sustainable development, in terms of ethics and morality. It has to be understood that the DDOI function is a time function; which is an economic resource, since its saving tends to generate an increase of productivity and profit.

The proposed Mathematical model is very suitable for application to optimization criteria used for profit maximization, maximization of renewable resources

consumption, minimization of production costs and energy costs, and is conveniently approached by means of multifactorial optimization, called Pareto optimization. Depending on the parameter, the minimum or maximum is evaluated. The general expression of the model problem for linear programming [7] as represented by the function fDDOI, is given by:

$$\left\{ \begin{array}{l} (\min)(\max) \sum_{j=1}^n c_j x_j \\ \sum_{j=1}^n a_{ij} x_j \leq (\geq) b_i, i = 1, m \\ x_j \geq 0, j = 1, m \end{array} \right\} \quad (1),$$

Where different variables c_j and x_j correspond to various quantities under consideration, e.g. cost and production; and $\left\{ \sum_{j=1}^n a_{ij} x_j \right\}$ represents the summation of the products $a_{ij}x_j$ for their values under the constraints given in the expression. In this minimum-maximum mathematical model, production x_j , represents the maximum function, and the secondary effects x_{j+n} denoting the technological activities represent the minimum functions. However, it must be noted carefully that the researcher or the person managing the whole system should have very accurate and detailed knowledge of the socio-economic and environmental characteristics of the state, where the social process being studied is operational, or of the industrial organization whose sustainable development is being assessed and evaluated, since only in that situation, the mathematical modeling and accurate methodology will provide useful information for the project work. It is also important to know the most important characteristics of the function, fDDOI, which are as: (i) The fDDOI function is continuous i.e. if there is a sufficiently small variation for each indicator (especially if this variation is defined for a single indicator) then the value of fDDOI does not change; (ii) The expression of fDDOI has an invariant characteristic, i.e. it is not affected by the change of the measurement unit used for indicator expression.

The fDDOI components f_1, f_2, f_3 etc., with practical applicability can be solved by means of simplex algorithms or other algorithms related to the operational research. It has to be understood that the DDOI function is a time function; as it is an economic resource, and its saving tends to generate an increase of productivity and profit. This is the reason that this function must include time factor. The identification of the sustainable development function for industrial organizations is done at a general level. However, for a more specific approach, this function has to be differentiated according to the country, region, and also the field of activity.

Another important case of the Sustainable Development is in which it is defined in terms of Earth System. Utilizing the concept of co-evolution of the N-A system (N being the 'Macro-state' of the Ecosphere, and A being the 'Macro-state' of the Anthroposphere), as noted by Schellnhuber [8], the sustainable development, for any specific point in time, can be by the equation given below:

$$S(t) = E(t) - H_{NI}(t) \quad (2),$$

Where S is the sustainable development, E is the environment i.e. the earth system that contains the ecosphere N and human factor H , H_{NI} represents the human needs and interests, and t is the time. It has to be noted that N here represents the sub spheres atmosphere, biosphere, and cryosphere. It is clear that for the determined or attributed values of E and H_{NI} , the level and nature of sustainable development depends upon the nature and level of impact, which the humans inflict upon the environment and which results in the depletion and degradation of resources and services offered by E . These determined or attributed values of E and H_{NI} correspond to the real-time data collected on the basis of the experiments, observations or quantitative measures like indicators or quantitatively-based Environmental Impact Assessment (EIA).

NOVEL EXPLANATION OF SUSTAINABLE DEVELOPMENT

The novel explanation for understanding Level and Nature of Sustainable Development can be determined as follows:

It is clear that the value of S depends upon the unit of measurement of the mode of assessment used to determine E , H_{NI} and hence S . Therefore, the values of E , H_{NI} and S serve as the representative indicators of the original data used for determining mathematically the potential or actual level of sustainability, which is achievable. As a level of S occurs at any point of time and for a specified spatial scale, so the determined or attributed value of E must be greater than the determined or attributed value of H_{NI} , which in the form of the mathematical expression is as given by:

$$E(t) \leq H_{NI}(t) \iff S(t) \leq 0 \quad (3),$$

However, if the determined or attributed value of E is less than or equal to the determined or attributed value of H_{NI} , then S is not governed by the above equation because there must be a continuous source of E and H_{NI} to use, and that it must not come in the way of the operation of the parameter for the safe operation of E . It is to be appreciated that the sustainable development theory, is not based only on the use of resources, but also on the impact that humans have upon the environment in terms of the parameters - production, consumption and waste.

QUALITATIVE REVIEW AND CONCLUDING REMARKS

Recently, it is being increasingly recognized that the organizations can profit significantly from the efficient resources and efficient waste management, and also from improved environmental management practices. Life Cycle Analysis is being used as a starting point for organizations seeking to improve the efficiency of their waste and resources management, by focusing on three topics: solid waste, energy and transport, besides considering the human factor such as workforce participation in energy saving schemes and the travel of the employees up to the workplace. For example, some successful efforts have notably been made in UK, in that an increasing percentage of the staff makes use of bus for reaching the workplace. Even those traveling by car, a car sharing matching scheme has been incorporated, which is even offered the best parking spaces suitable for the users so as to save their time in a convenient manner. Similarly, simple measures have been taken to reduce the costs of heating buildings, by employing the draught-proofing doors and windows and insulating pipes to radiators, along with choosing low ceilings for the buildings. Clark, et al. [9] have discussed the previous research on the determinants of effectiveness in knowledge systems seeking to support sustainable development, and have highlighted the importance of the term boundary work, through which the research communities organize their relations with new science, other sources of knowledge, and the worlds of action and policy making. They have also discussed that a growing body of scholarship postulates specific attributes of boundary work, which promote the useful research, and have pointed out that these propositions, however, are largely based on the experience of a few industrialized countries. With this background, they have reported on an effort to evaluate their relevance for efforts to harness science in support of sustainability in the developing world, by carrying out a multicountry comparative analysis of natural resource management programs conducted under the auspices of the Consultative Group on International Agricultural Research. Their interesting observations are: Discovery of six distinctive kinds of boundary work contributing to the successes of those programs with a greater variety than has been documented in previous studies. It has been argued that these different kinds of boundary work can be understood as a dual response to the different uses for which the results of specific research programs are intended, and the different sources of knowledge drawn on by those programs. It is interesting to note that they have shown that these distinctive kinds of boundary work require distinctive strategies to organize them effectively; especially the arrangements being considered as important regarding the participation of stakeholders, accountability in governance, and the use of boundary objects. It has been concluded by stating that improving the ability of research programs to produce useful knowledge for sustainable development requires both greater and differentiated support for multiple forms of boundary work.

The subject has gained tremendous interest in view of the great progress being made in the corporate world. Recently, there has been a spurt in the studies made on this subject. Stone and Deadrick [10] have presented an outstanding outlook of

the Human Resource Management (HR), they have emphasized that in the modern world, and the field of HR is facing many pressures for change. Many parameters like Shifts in the economy, globalization, domestic diversity, and technology have led to the new and important demands for organizations, and propelled the field in some completely new directions. But it is felt that these challenges also create numerous opportunities for HR and organizations as a whole, and hence the primary objectives are examining some of the challenges and opportunities influencing the future of HR. Stone, et al. [11] have studied in detail the influence of technology on the future of human resource management and have reviewed the current effects of technology on HR processes, considering the existing literature on the topic, discussing the advantages and potential limitations of using these systems, and offering directions for future research and practice on using technology to facilitate HR processes. As discussed by them, in the recent years, information technology has had a profound effect on HR processes and practices, though relatively little research has examined its effectiveness, and most of the existing studies have not assessed the degree to which these new systems enable organizations to reach their HR goals of attracting, motivating and retaining employees. They have explained that the primary reason for this is that there are a number of limitations associated with current systems including the fact that they: (i) use one way communication systems, (ii) are impersonal and passive, (iii) do not always allow for interpersonal interaction, and (iv) often create an artificial distance between individuals and organizations.

Mark, et al. [12] have presented a review, which takes an evolutionary and chronological perspective on the development of strategic human resource management (SHRM) literature, by dividing this body of work into seven themes that reflect the directions and trends researchers have taken over approximately thirty years of research. They have pointed out that during this time the field took shape, developed rich conceptual foundations, and matured into a domain that has substantial influence on research activities in HR and related management disciplines. In addition, they have traced how the field has evolved to its state prevailing at that time, by articulating many of the major findings and contributions, and have discussed how it will evolve subsequently. Their approach has contributed to the field of SHRM by synthesizing work in this domain and by highlighting areas of research focus that have received perhaps enough attention, as well as areas of research focus that, while promising, have remained largely unexamined.

Keating, et al. [13] have studied the case of the Engaged employees, who work vigorously, feeling dedicated and mentally absorbed in their work. Though, much is known about the kinds of jobs and work environments that stimulate employee engagement, yet levels of disengagement remain high in many organizations. To provide fresh insights into how to increase engagement, Keating, et al. [13] have drawn on theory and research in social, educational, and organizational psychology to illuminate how mindsets are a personal resource that may influence employees' engagement via their enthusiasm for development, construal of effort, focus of attention, perception of setbacks, and interpersonal interactions. In addition, they

have outlined several avenues for future research, as well as practical implications for organizational, managerial, and individual-level initiatives for increasing engagement via supporting employees in adopting and sustaining a growth mindset with regard to the challenges they encounter at work.

Buller and McEvo [14] have built on previous theory and research on strategy and human resource management to identify important linkages between the firm's strategy, its human resources, and performance outcomes, by reviewing the relevant literature focusing in particular on the role of human resources in creating competitive advantage, and subsequently presenting a multi-level model illustrating how human resource management practices can effectively align organizational, group and individual factors with the organization's strategy. Another interesting point is that they have redefined the line of sight as the alignment of organizational capabilities and culture, group competencies and norms, and individual KSAs, motivation and opportunity with one another and with the organization's strategy. In addition, they have proposed that such alignment contributes to the creation of human capital and social capital, both of which are necessary to achieve and sustain superior performance.

Ulrich and Dulebohn [15] have discussed that over the last three decades, the practice of HR has experienced significant transformation, including HR moving from being a lower level, administrative and maintenance oriented function to operating in many organizations as a core business function and a strategic business partner. They have argued that because of dramatic changes that have occurred in HR, the question arises whether HR has arrived at its final destination or whether the journey will continue, and if so, what will be HR in future. They have studied this in setting the stage to discuss the future of HR. Ulrich and Dulebohn [15] have briefly described the journey HR has traveled thus far since its emergence as a field, and have characterized HR's journey as having a singular direction and that is to add value to the organization, and to continue in this direction, have proposed that future HR will need to adopt an outside/inside approach where the external environment and stakeholders influence what HR does inside the organization. Another important point made by them is the discussion about other specific actions HR will need, in order to add value, with respect to targets for HR work (individual, organizational, and leadership) and areas for HR investments (HR function, HR practices, HR people, and HR analytics). Finally, they have presented a number of propositions on these, which can be used by researchers and practitioners in guiding future research and practice.

Marchington [16] has discussed that HRM has always been located at the interface of potentially conflicting forces within organizations, and that in its quest for legitimacy, HRM has tended primarily to look up the hierarchy and focus on narrow performance goals, so neglecting other long-standing values and stakeholders. It has been emphasized that unless HRM reasserts its independence, it is likely to wither both in academic and practitioner circles.

Cohen [17] has discussed that (i) the HR's past is relatively long and humble; the present being both positive and challenging, and the future of HR presenting the profession with opportunities and even more thought-provoking challenges. Cohen [17] has also discussed briefly as to where the profession has come from and where it is today, and focused primarily on the opportunities and choices available to those individuals who deeply care about the profession and those who may take more notice of the profession in the future. It is now well established that among the opportunities are HR standards, HR competencies, consistent HR curriculum, HR professional development and HR research.

Sikora and Ferris [18] have suggested that the implementation of effective human resource (HR) practices typically rests with line managers, and have used the social context theory to propose that line manager HR implementation is influenced by organizational culture, climate, and political considerations. It has been emphasized that subsequently, HR implementation is anticipated to drive employee outcomes. Jeanette, et al. [19], have used the Ecological Systems Theory, to propose a four-part approach to HRM: short vs. long-term relationships, life-course changes, multiple contexts and success criteria, and permeable and reciprocal influence infusing HRM with a psychological concern for human dignity results in respect for humanity at work, as well as advocacy for employees and their communities.

Sparrow and Makram [20] have presented a paper using two concepts to organize the talent management literature: talent philosophies and a theory of value, by introducing the notion of talent management architectures and first analyzing four talent management philosophies and the different claims they make about the value of individual talent and talent management architectures to demonstrate the limitations of human capital theory in capturing current developments. After demonstrating the complexity of issues being researched, they have synthesized these back down into a theory of value, and developed a framework based on four separate value-generating processes (value creation, value capture, value leverage and value protection), which framework draws upon a number of non-HR literatures, such as those on value creation, the RBV perspective, dynamic capabilities, and global knowledge management, and its use to understand the nature of value and how this might inform the design of any talent management system or architecture.

World Business Council is of the opinion that the Sustainable Development involves the simultaneous pursuit of three components - economic prosperity, environmental quality and social equity. The business firms aiming for sustainability have to perform not against a single, financial bottom line but against the triple bottom line. It has now been well understood that the human and social values change with time. As a case study, it can be seen that the concepts like possessing slaves, and franchises of women as a commodity, once considered extraordinary are now nothing but very ordinary; and some new concepts like responsibility toward consumers, environmental justice, and generational equity are showing increasing trend in

importance and the attached value.

In the same way, the corporate social responsibility has become a very important subject, drawing a lot of researchers engaged in studying the modern Corporate Sector and the associated policies. The ethical issues have been identified among the most pressing topics [1] for business research today, while 'Sustainability, responsibility and ethics' is one of the six areas of research excellence [2] being prioritized at Royal Holloway. It is thus quite clear that the topic of "Resources Management and Sustainable Development" has been categorized as the very important subject by the Business Management experts at the leading universities during the last five years. Recently a very important International Sustainable Development Research Conference [21] was held, in which the central themes were: (i) Crisis, complexity, global change and transitions, with a critical analysis of the science of sustainability, academia, ethics and leadership; (ii) Rethinking development in terms of greening the developmental state, new forms of urbanism in the context of ecology, social development and food security; (iii) Better Governance, institutions and economic structures, to support sustainable development and design; and (iv) Achieving rapid transitions for sustainable living, decoupling production and consumption from resource limits and ecological constraints, and pioneering innovative, livable and sustainable contexts. Also, the major issues emerged were as: (i) Technical interventions, in which it was explained that the Technological progress can be very helpful in the transition to sustainability. A lot of research studies based on life cycle analysis for buildings and the airline industry, resource loop closing, and methods for corporate social and environmental reporting, and their results were presented. (ii) Sustainability indicators for measuring sustainability for providing a means to monitor progress and when necessary redirect effort, in which many types of indicators, more currently of relevance to the companies and sustainable manufacturing were discussed. (iii) The importance of the individual: w.r.t. the organization was discussed. (iv) Regulations as an effective way of generating uptake of an existing technological or organizational initiative for sustainability was discussed. (v) Progress towards sustainability must be cognizant of present conditions and sensitive to variations in needs/preference/capacity for change. The subject is so important for the development of the organizations, that many seminars on the exchange of the ideas of the experts in the field are being held. One such seminar on Managing and Conserving the Natural Resource Base for Sustained Economic and Social Development was recently held this year itself, which gave a reflection from the International Resource Panel on the establishment of Sustainable Development Goals aimed at decoupling economic growth from escalating resource use and environmental degradation. It focused its attention on a large extent on: (i) the Eradicating of the absolute poverty by breaking the vicious circle of over-consumption, environmental degradation and poverty; (ii) Ensuring food security and nutrition by adopting sustainable use of land based resources; and (iii) Achieving universal access to safe and clean water and also sanitation by enhancing efficient use of water and nutrients [22-24].

The emphasis was also on (i) Securing access to the universal energy by incorporating resource efficient and low carbon energy systems based on the renewable energies; and (ii) Creating sustainable livelihoods and equitable growth by promoting technologies and innovations for sustainable resource use. An important Course on Natural Resource Management for Sustainable Development was recently held by the Danida Fellowship Centre.

CONCLUSION

The aim of which was to improve the participants' abilities to plan for and bring about positive change, and thereby strengthen their respective institutions. The course was organized by NIRAS in cooperation with the Nordic Agency for Development and Ecology (NORDECO). It had great emphasis on the practical insights and tools which are relevant to the challenges faced by participants in their jobs. The course consisted of lectures, field trips and group work, and focused on the best practices, ranging from techniques and technologies to awareness raising and community organization. Also, the Sharing of the national experiences among participants was coupled to a review of global trends and developments. The course highlighted the Danish expertise in natural resources management in field trips and visits to relevant institutions. Therefore, in view of all these recent important studies, lectures, and seminars on this very important field, it can be safely concluded that the subject of Resources Management and Sustainable Development is growing and evolving very rapidly.

ACKNOWLEDGEMENTS

The author is grateful to the Dr. Nand Kishore Garg, Chairman, Maharaja Agrasen Institute of Technology, GGSIP University, Delhi for providing the facilities for carrying out this research work, and also for his moral support. The author is thankful to Dr. M. L. Goyal, Director, for encouragement. Thanks are also due to Dr. V. K. Jain, Deputy Director for his support during the course of the work. The author is thankful to Prof. V. K. Tripathi, Department of Physics, Indian Institute of Technology, Delhi for useful discussions and various suggestions which have significantly improved the presentation of the paper.

REFERENCES

1. Alessandro B (2013) DBA Program, Thesis and Research Coordinator. European University Business School, Spain.
2. Gillian S (2013) Director of PhD programs at the school of management. Royal Holloway, University of London.
3. Clark WC, Crutzen PJ, Schellnhuber H-J (2005) Science for global sustainability: toward a new paradigm. Harvard University Center for International Development.
4. Comolli P (2006) Sustainability and growth when manufactured capital and

- natural capital are not substitutable. *Ecological Economics* 60: 157-167.
5. Omer AM (2008) Energy, environment and sustainable development. *Renewable and Sustainable Energy Reviews* 12: 2265-2300.
 6. Michel De L, Cermics (2014) Ecole des Ponts. Tech Université Paris, France, Ecole des Ponts ParisTech.
 7. Bucur A, Boncuț M (2007) Cercetari operationale. Note de curs și seminar, Ed. ULBS Sibiu.
 8. Schellnhuber H-J (2001) Earth system analysis and management. In: Ehlers E, Kraft T (Eds.), *Understanding the earth system: Compartments, Processes and Interactions*. Springer-Verlag, Berlin Heidelberg, pp: 17-55.
 9. Clark William C, Tomich Thomas P, Noordwijk MV, David G, Delia C, et al. (2011) Boundary work for sustainable development: Natural resource management. Consultative Group on International Agricultural Research. <http://www.pnas.org/content/early/2011/08/11/0900231108.abstract>
 10. Stone Dianna L, Deadrick Diana L (2015) Challenges and opportunities affecting the future of human resource management. *Human Resource Management Review* 25: 139-145.
 11. Stone Dianna L, Deadrick Diana L, Lukaszewski Kimberly M, Johnson R (2015) The influence of technology on the future of human resource management 25: 216-231.
 12. Mark LL-H, Cynthia AL-H, Leticia SA, Drake B (2009) Strategic human resource management: The evolution of the field. *Human Resource Management Review* 19: 64-85.
 13. Keating Lauren A, Heslin Peter A (2015) The potential role of mindsets in unleashing employee engagement. *Human Resource Management Review* 25: 329-341.
 14. Buller PF, McEvo Glenn M (2012) Strategy, human resource management and performance: Sharpening line of sight. *Human Resource Management Review* 22: 43-56.
 15. Dave U, Dulebohn James H (2015) Are we there yet? What's next for HR? *Human Resource Management Review* 25: 188-204.
 16. Marchington M (2015) Human resource management (HRM): Too busy looking up to see where it is going longer term? *Human Resource Management Review* 25: 176-187.
 17. Cohen Debra J (2015) HR past, present and future: A call for consistent practices and a focus on competencies. *Human Resource Management Review* 25: 205-215.
 18. David S, Ferris GR (2014) Strategic human resource practice implementation: The critical role of line management. *Human Resource Management Review* 24: 271-281.
 19. Cleveland J, Zinta SB, Cavanagh TM (2015) The future of HR is RH: Respect for humanity at work. *Human Resource Management Review* 25: 146-161.
 20. Sparrow Paul R, Heba M (2015) What is the value of talent management? Building value-driven processes within talent management architecture. *Human Resource Management Review* 25: 249-263.

21. ISDRC19 (2013) 19th Annual international sustainable development research conference-2013. Cape Town, South Africa.
22. International Resource Panel (2014) Managing and conserving the natural resource base for sustained economic and social development. UNEP.
23. Jackson Susan E, Angelo D, Hitt Michael A (2003) Managing knowledge for sustained competitive advantage: designing strategies for effective human resource management.
24. (2014) Natural Resource Management for Sustainable Development, Copenhagen, Denmark.