

# INDUSTRIAL ENGINEERING SUPPORT FOR EMERGING BUSINESS MODELS

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## 1. INTRODUCTION

According to FutureWorld (see <http://asp.futureworld.co.za>) the past two decades have seen three major revolutions transforming world markets. The combination of globalisation, new management thinking and technology creates vast new open deregulated markets, wired together by a converging information highway. New and transformed organisations are emerging as leaders as they re-write the rules of business [1,3,5]. The South African business environment is currently faced with enormous changes, brought about by new technologies and the quest for global competitiveness. This paper presents established and new disciplines required to deal with emerging business models as seen from an industrial engineering perspective.

## 2. BUSINESS ENGINEERING

Industrial engineering is concerned with the design, improvement, and installation of integrated systems of people, materials, information, equipment and energy. It draws upon specialist knowledge and skill in the mathematical, physical, and social sciences together with the principles and methods of engineering analysis and design to specify, predict and evaluate the results to be obtained from such systems (<http://ie.up.ac.za/>).

Business engineering is a systems approach to the analysis, design, development and construction of complex business systems, focusing on business processes as the integrative component of the total system. Using a systemic thinking view, a development foundation for new business models are defined through the following principles:

- a *top-down* approach to view the system as a whole,
- A *life-cycle* orientation which addresses the phases of system design, development, production and/or construction, distribution, operation, maintenance, support, retirement, phase out and disposal,
- better and more complete effort to the *initial definition of system requirements*, and
- Interdisciplinary or team approaches throughout the system design and development process to ensure that all design objectives are addressed in an effective and efficient manner [9].

The vertical implication of this approach is that the whole life cycle approach is process-based, from the customer need identification to conceptual design, implementation and maintenance. The horizontal implication is concerned with three specific business life cycles, the process of the product/service manufacturing/construction, the product support process and the service capability process [3].

### 3. ESTABLISHED INDUSTRIAL ENGINEERING DISCIPLINES

Future trends show that from the industrial engineering perspective, the ability to design, maintain and manage organisations will center on *process-*, *change-* and *knowledge* capabilities. Within this context the following disciplines are selected from industrial engineering curricula believed to be of value for creating new business models, that is operations management, engineering economy, total quality management, continuous improvement, project management, simulation/resource optimisation, and information system development (<http://ie.up.ac.za/>).

### 4. EMERGING DISCIPLINES

Given the requirements to assist the engineering of organisations, the following new or emerging disciplines are proposed to compliment and supplement the selected disciplines (see paragraph 3); *performance management*, *knowledge management*, *business architectures*, *change management* and *business process engineering*.

**Performance Management's** [6] core focus is to ensure that *alignment* takes place between the vision, strategy and operations within the organisation. This means that work done in the organisation has to contribute towards the achievement of the stated business objectives.

**Knowledge Management** [8] is traditionally seen as the management of information and secondly the management of people. Combining these two focus areas, knowledge management follows a discipline through which value is created from an organisation's non-tangible assets. By managing non-tangible assets, organisations can increase economic value-add many times over.

**Business Architectures** [7] are models of the organisation, used to blueprint organisational components and the interface and/or integration of organisational components. This may include strategic -, process- , resource-, information-, or human resource architectures defined at conceptual levels, logical levels, and physical levels.

The **Change Management** [3] discipline deals with organisational change in two ways, first the work activities required to implement changes in the organisation, and secondly dealing with people experiencing changing conditions in the organisation [2]. Work actions need to be planned around the change of process, structure, people, resources and strategy in the organisation through plans, deliverables, timetables and supporting infrastructures.

**Business Process Engineering** [4,5] is an engineering approach used to change business processes. Organisations execute business process engineering projects with the aim to achieve breakthrough innovations which will result in the creation of business value. However to achieve this, business processes should be treated in a holistic manner dealing with customer, process, people, structure, resources and strategy [5,9].

Performance management, knowledge management, business architectures, change management and business process engineering deal with with *process-*, *change-*, and *knowledge* keys as required to design and implement emerging business models.

## 5. CONCLUSION

It is believed that the field of Business Engineering is based on a number of current and emerging industrial engineering disciplines. Current disciplines include operations management, engineering economy, total quality management, continuous improvement, project management, simulation/resource optimisation, and information system development. New disciplines to add are *knowledge management* (to transform knowledge from an intangible asset to a tangible asset), *business architectures* (to allow organisations to build organisational blueprints), *change management* (to assist in organisational change and implementation), *business process engineering* (to manage business processes) and *performance management* (to align change to organisational goals). Combining these disciplines with established industrial engineering disciplines allow organizations to plan and implement business solutions in the organisation, changing all organisational components in a holistic manner to create business value-added.

## 6. REFERENCES

1. D. Birchall and L. Lyons. *Creating Tomorrow's Organisation*. FT Pitman Publishing. (1995).
2. Change Management training course. *Persetel-Qdata Business Consulting*. (1998).
3. RB Chase, NJ Aquilano, Jacobs. *Production and Operations Management, Manufacturing and Services*. Irwin. (1999).
4. M. Hammer. Reengineering Work: Don't Automate, Obliterate. *Harvard Business Review*. July-August. 104-112(1990).
5. R. Pascale, M. Milleman and L. Gioja. Changing the way we change. *Harvard Business Review*. November-December. 127-139. (1997).
6. Hermann Spangenberg. *Understanding and implementing Performance Management*. Juta & Co, LTD. (1994).
7. Steven H Spewak. *Enterprise Architecture Planning*. Johan Wiley & Sons.
8. Karl Erik Sveiby. *The New Organisational Wealth*. Berret-Koehler Publishers, Inc. (1997).
9. K. Venkatraman and JC. Henderson. Real strategies for virtual organizing. *Sloan Management Review*. Fall. 33-47. (1998).