



*International Food and Agribusiness Management Review*  
*Volume 15 Special Issue A*

## **Technological Transition and the New Skills Required by the Agribusiness Sector**

*Global Networks, Global Perspectives and Global Talent*  
*Discussions on the Development of Human Capital in Agribusiness<sup>1</sup>*

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### **Abstract**

Adoption of new technologies throughout the agribusiness chain is necessary to meet the higher food and fuel needs of a growing and wealthier population. However, modern technologies require the development of new skills and changes in working patterns and relationships at all levels of the organization. Companies that invest in technology without investing in human capital development will not reach their full potential.

**Keywords:** technological advances, Brazil, human capital

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<sup>1</sup> This Special Issue was made possible through the generous support of Alltech and Kincannon & Reed. The essay collection was distributed during a special session on human capital development presented during the IFAMA 2012 Forum in Shanghai, China on June 14, 2012.

## **Introduction**

The agribusiness sector has become an industry that makes production efficiency a priority. Attitudes and production processes are changing as the market evolves. The changes imposed by globalization are hard to ignore and are putting pressure on companies to increase production volume to meet the higher demands of a growing and wealthier population. Companies have to compete in a global environment where the competition is tough.

Companies are hopeful that improvements in technology will help them meet the increased demand. The use though of technology in production is different across nations, companies and operators. There is a technological gap and this gap can determine the competitiveness of a company. This 'technological gap' can limit a company's ability to compete in a changing market. If a company uses outdated equipment, they run the risk of becoming obsolete (Baptista 2009). Managers need to realize the importance of investment in human capital to teach workers how to use and understand new technology.

Given the complexity of the global market, the lack of understanding of advanced technologies can handicap companies in their ability to compete globally. This weakness is found among managers, equipment operators, businesses and organizations around the globe.

For Robbins (2008), Spector (2009) and Baptista (2007, 2009), the acquisition of new technology creates changes in an organization. Working patterns, techniques and management models change as human capital requirements change. According to the studies of Dutra (2001) and Zarifian (2003), these factors drive change in the behavior of employees and require employees to develop new skills.

We live in a time that demands increases in production efficiency. This is causing a change in the relationship between human beings and equipment and technology in the workplace. Workers have to quickly learn how to use new technologies to meet the pressures of a changing global market. It is a world that Trivinho (2001) characterizes as techno-symbolic and involves a techno-acculturation.

The use of technology in agribusinesses is not a recent development. People have used various forms of technology in production for centuries. In every period, new patterns of behavior were required as technology developed and changed the way work was done. In general though, compared with other industries agribusiness technology has been rustic. For example traditional agriculture often employed very basic tools. The technological development of these tools though has allowed the industry to keep pace in food production to meet the world's growing demands. At every stage in history, changes in technology required changes in working patterns and the development of new skills to operate the new technology. All of these new technologies generated a reduction in the time needed to perform a task and helped increase output and improve quality.

A reduction in the time needed to produce goods was the goal of Taylor and is still one of the roles of engineers who develop equipment updates and calculate the advantages of machines with "zero defects" and higher productivity. Everyone searches for maximum efficiency and the effectiveness of the results are judged by corporate leaders. These corporate leaders demand that workers operate at the highest technological standard to compete in the global market.

Why do we characterize technology as a factor of great impact if it has been present for so long? The answer lies in the increased efficiency and rapidity of change associated with the microprocessor; without it, globalization would not be the same. This change has profoundly impacted the policies of planning and development of human resources that are now not directed only to "doing it faster," but "how" to operate the new technology.

How is it possible to change the existing management structure that was built up around old technology? The old machines that are being replaced by equipment using cutting-edge technologies mark a new reality in agribusiness and require significant changes in teaching and developing workers.

The answer lies in the new models that have developed that focus on increasing human capital. They require equipment operators participate in training exercises on equipment maintenance, technology use and work techniques that emphasize teamwork, creative thinking, multifunctionality and a systematic view of the machine and task. This comprises a set of new agribusiness skills needed to perform work effectively. Operators must study technology, and not only in an operational sense.

Ironically, technology—demonstrates the need to revisit the holistic view of work. This vision calls for a redesign of labor relations and the role of leadership in companies. The need for new skills is not directed only at the leadership, but also to the workers who must operate the equipment.

## **Agribusiness and Brazil**

According to studies by the Brazilian Ministry of Agriculture, “The world is experiencing a period of great concern, particularly after the outbreak of the financial crisis in the United States in September, 2008. The links in agribusiness supply chains often need to review their plans for making the best decision possible” (2011). Although all nations are under pressure, Brazil’s leading position in the agriculture sector makes it a leader in the development of new management techniques in agribusiness: The three main categories that need to be looked at are: a review of management/leadership styles, new worker categories and the demand for equipment using cutting edge technologies. Brazil’s agriculture sector is expected to grow 40% by 2019 (Agroanalysis 2012; FAO 2011). This calls for a review of public policies related to agriculture and the use of equipment using cutting edge technologies. For example, in the case of the alcohol-sugar sector, technology is continuously changing. With the expansion, professionalization and mechanization of harvesting techniques, the role of workers within the sector is changing (Liboni and Albuquerque 2010).

In all sectors, old machines are replaced by new equipment using technologies such as GPS (Global Positioning System), self-lubrication, spray sensors, safety systems for night work, intelligent fertilizing and spraying, etc. This marks a new reality in agribusiness as well as significant transformations in human resource policies for the sector. These factors indicate the need for a close relationship between the manufacturers of agricultural equipment and companies in the alcohol-sugar sector in the training of manpower. New ways of managing professionals who work in this sector are needed. When deploying the latest technologies, the simplest tasks may appear to be overly complicated for workers who have not had the right training.

Under the assumption that the complexities of the equipment require new skills from the operators, managers should redesign the way they manage the operators. Old management practices cannot generate the changes necessary for organizations to benefit from the adoption of advanced technologies. The old autocratic leadership style that prevails in the archaic structures does not get results in technological models that emphasize skills such as creativity, integration, systematic vision, initiative, internal entrepreneurship, assertiveness, resilience, communication, teamwork and continuous change. The naive action of only investing in equipment and forgetting about human capital can lead an organization, and even a country, to failure.

The latest technologies are not just operationalized, they need to be integrated into the company to achieve their full potential. In this case, the worker—a semantic term also obsolete – becomes a thinker within the organizational system and is dependent on a leadership that fosters these skills.

All these aspects show the challenges in the agribusiness sector with regards to the training of manpower. It is necessary to invest in human capital to generate the development of these new skills to create an increase in productivity to meet international demand. The need to develop human capital at every level of production is a need that rarely bothered the agriculture sector in the past.

## **A Look Forward**

How do you move an organization from stagnation into a high technology environment? There are different methods and actors that all play a role. One is the very organization that needs to review their assumptions about innovation, the 'life' of an idea, its management policies and strategies. After all, the human being is not reducible to a simple stimulus-response or a segmented functional reaction. The complexity that involves the transition into environments that use advanced technologies is subject to the human brain, which is an interconnected network of billions of neurons. The success of a new technology depends on the gradual assimilation of old and new systems. Without new technologies and new management systems, traditional systems would not be able to provide solutions to the new problems created by a changing global market.

Adoption and adaptation should not be an isolated action or the sole responsibility of organizations, but a connection of strategies involving entrepreneurs and public policies aimed at both the agribusiness sector and the education sector.

According to the IPEA, as early as the 1990s, Brazilian agriculture has been gradually integrated into the system of large transnational corporations that dominate the main chains of global agribusiness. In the case of the alcohol-sugar sector, this accelerated the growth rate. This growth generated an investment in equipment in the agriculture and manufacturing areas to help meet the growing demand for vehicles that use ethanol. For Barbosa et al. (2009), the change meant the industry required more manual labor, and also more investments in training workers. The sector has sought to address the knowledge gap, through an investment in training workers and human capital development. In this way, workers learn to not only use the new technologies available to them but understand the increased production potential that comes with adoption.

Identifying the process of alignment between available human capital and acquisition of technology is a necessary condition to decipher the problems faced by the sector.

The equipment industry also has an important role in creating partnerships with businesses. The equipment industry needs to train the manpower that will operate the technology, as well as continuously developing human resources in the industry: HR-HR relations (HR-manufacturer/HR-agribusiness). This partnership is one of the solutions to avoid the stagnation of knowledge and enables the training of skilled manpower. This helps equipment operators connect with clients/industries that use the machines they sell. These clients/industries are responsible for the technological innovation needed to create new equipment. In this skills training strategy, the State, as well as bodies representing the workers and industries in the sector must also make investments designed to meet the needs of a skilled workforce.

Only well-coordinated action can help increase the number of trained citizens in the face of new technological developments in the coming years. The technological gaps are not a determinist condition, but a reflection of evolutionary constraints to be corrected. Thus, despite the archaic thinking or strategies still in force, the technologies used by the agribusiness sector require a revision in the relationship between managers and employees and the ways workers operate in the sector. The use of new technologies does not guarantee success; human capital is needed to help meet industry needs and the global demand for food. The desired competitiveness will be achieved by investing in both human capital development and new technology.

## References

- Agroanalysis. O Papel dos emergentes. Disponível em: [http://www.agroanalysis.com.br/materia\\_detalhe.php?idMateria=859](http://www.agroanalysis.com.br/materia_detalhe.php?idMateria=859). (acesso em: Mar. 2012).
- Baptista, R. D. 2009. Comunicação e cultura organizacional: O papel das tecnologias e rede digitais na mudança dos sistemas de trabalho na era da globalização. Doutorado em Comunicação e Semiótica. Pontifícia Universidade Católica de São Paulo, PUC/SP.
- \_\_\_\_\_. Comunicação e cultura: os gaps tecnológicos e os impactos sobre as pessoas. Disponível em: <http://www.cibersociedad.net/congres2006> . (Acesso em: 18 Jan. 2007).
- Barbosa, E. T. et al. 2009. Responsabilidade social das usinas do setor sucroalcooleiro: uma análise do nível de investimento em aspectos sociais internos, externos e ambientais. UFPB.
- Dutra, J. 2001. Gestão por competências. São Paulo: Gente.
- FAO. Brasil deve liderar expansão da agricultura. Disponível em: <http://www.fao.org/news/story/es/item/43238/icode/> (Acesso em: 22 de June. 2010).
- Ipea. 2008. Desenvolvimento rural. Políticas sociais – acompanhamento e análise. n. 16, nov.
- Liboni, L. B., L. G. Albuquerque. 2010. Gestão de pessoas no setor sucroalcooleiro. Observatório do setor sucroalcooleiro, FEA.
- Ministério da Agricultura, Pecuária e Abastecimento. Brasil projeções do agronegócio 2010/2011 a 2020/2021. Disponível em: <http://www.agricultura.gov.br/> Acesso em: 06 de mar. 2012.
- Robbins, S. 2008. Comportamento organizacional. São Paulo: Prentice Hall, 2008.
- Spector, P. 2009. Psicologia nas organizações. São Paulo: Saraiva, 2009.
- Trivinho, E. R. 2001. O mal-estar da teoria: a condição crítica na sociedade tecnológica atual. Rio de Janeiro: Quartet.
- Zarifian, P. 2003 Objetivo competência: por uma nova lógica. São Paulo: Atlas.