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S. Athambawa<sup>(1)</sup> and M.A.C. Salfiya Ummah<sup>(2)</sup>

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# Influence of Knowledge on Technology Adoption in the Rice Milling Industry for Transformation of the Business in the Ampara District

1), (2) Dept. of Management, South Eastern University of Sri Lanka, Oluvil, Sri Lanka.

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**Abstract:** The importance of technology adoption to businesses is widely acknowledged. Yet, while large businesses have been using sophisticated technologies for some time, small businesses have been slow adopting it. This paper examines the effect of knowledge of the owners/ managers and adoption of technology among Rice millers in the Ampara district of Sri Lanka. This is an explanatory study and the analysis is quantitative based on managerial level people in rice mills and hypothesis was formulated and tested using data collected from a sample of 28 rice millers in the district. The results suggest that the business related knowledge of Rice millers are not much influencing on technology adoption for transformation of their businesses.

**Keywords:** knowledge, Technology Adoption, Transformation of Business

## Introduction

Changes in the organizational values, cultures, systems and strategies are making the organizations stronger for a competitive business. Because of the technological advances, more competitors are entering into a market and creating a situation for more substitutes for customers in market. The advanced technologies are being introduced by the developed countries for making their firms to do the business more innovatively. The customers are expecting the right quality products from any part of the world. When the products are introduced into the Internet business, customers around the world are getting knowledge about the particular substitutes available in

the market. Therefore, we need to have different knowledge to do the business to attract the customers locally and internationally.

In today's era of global competition and rapid product obsolescence, the primary value-creating capability of the firm revolves around its ability to exploit its intellectual capital which is housed in the form of two types of knowledge. Those are Explicit and tacit knowledge. Explicit knowledge can be defined as knowledge that can be displayed in numbers and words that can be shared easily. It includes data compiled, work processes, reports, formulas, and so forth. Tacit knowledge can be described as unarticulated knowledge. It is hard to formalize and difficult to express. Tacit knowledge is developed by an individual's and organization's insights, beliefs, values, and perspectives developed over time (Riesenberger, 1998). So, explicit and tacit knowledge helps the organization for innovations and new creations in the products or services through innovative ideas easily. The organization should have proper mechanism to improve and apply that knowledge in activities of the firm.

Therefore, the organization should have the knowledge of customers (needs, demographic factors of customers), about best practices/ effective processes available in the industry (benchmark of the product, improved development cycles), about own competencies and capabilities (learn tacit and explicit knowledge, strengths and weaknesses), about own products and services and about emerging market trend and competition in the industry. Survival or leading in the industry must require the higher level of

knowledge about those factors. Modern technology allows the organization to get knowledge about those factors effectively and efficiently.

Transformation is meant to create or anticipate a future, place a few big bets, create new competencies and competitive areas, harness new sources of power, understand the importance and impact of evolving technologies, processes and organizational structures, with a vision to sustain competitive advantage. The approach towards transformation is evolutionary in nature and comprises both continued support and focus on current business operations and traditional services, as well as delivering a series of new initiatives to the business incrementally over time. This is usually accompanied with changes in organizational culture and processes, deployment of next-generation solutions, acquisition of new skill sets and capabilities through training and new hiring coupled with phased retirement of traditional infrastructures and old ways of doing things (Oxford City council, 2008).

Ampara district is blessed with natural resources which can be used as industrial raw materials and value added products. The industrial sector of the district comprises a few large industries, small and medium scale enterprises (SMEs) as well as micro or household businesses that are based on self-employment activities. Over the past three decades, the District had been engulfed in war complexities, resulting in the disruption of normal economic and social life of the people. Excessive damage to public and private assets, displacement of farmers and fishermen, loss of income, decline in investment, restriction in movement of farmers and fishermen, disruption of supporting services (Extension, agrarian, veterinary, marketing, input supply, transport and Others), inadequate social and physical infrastructural facilities and security limitations have led to a substantial reduction in the crop, livestock and fisheries production. As a result, agriculture sector was badly affected resulting in lower GDP to the provincial economy. Even though the contribution from agriculture sector to GDP has halved in the last two decades, agriculture still plays vital role in the economic development of the district. Therefore the agriculture sector will remain as the largest in absolute

terms, and must be strengthened to attain economic prosperity of the country.

As agriculture is the backbone of district economy, there is further room for increase the productivity in the Agriculture sector through the use of improved seed varieties, new technologies and innovations, and mechanization, which could be promoted through farmer awareness by way of an effective extension services. In addition, increasing value addition by promoting agro-based processing industries, improving awareness on proper usage of fertilizer, rehabilitation of irrigation networks, and infrastructure facilities would also help to increase the productivity in the agriculture sector. (CBSL Report, 2010).

Even though a high volume of paddy is cultivated in the District, a rice mill of the required standard is not available. The entire paddy production goes out of the province/District for milling. This is a missed opportunity for the business community in the District. By this study, I attempt to find the adoption of new strategies for the transformation of the business enterprises in the area, especially from a technological perspective mainly focusing on Rice millers.

In the view of the researcher, most of the rice millers face the big problem in relation to technological change and the adoption of changes among the employees in the working places. This changes highly impact on employees' satisfaction and their performance too. So, these issues are to be studied empirically. There are very few studies carried out in Sri Lanka in respect of rice millers. It seems that there is a gap in this knowledge about testing the relationship between technology adoption and knowledge towards transforming the business. This paper is focusing on addressing the following research questions.

1. Is there a significant relationship between knowledge and technology among rice millers?
2. What factors of knowledge constitute to proper adoption of technology among rice millers?

The objectives of the paper are to investigate,

1. Whether knowledge significantly relates to transforming the business?

2. To find out the effectiveness of rice millers adoption of technology
3. To explain how transformation should be to improve the knowledge.

## Literature Review

Historically, scholars have recognized that technological change or technological innovation plays a significant role in a firm's productivity, which in turn can lead to competitive advantage (Porter, 1985). Technological innovation is regarded as an engine of economic growth, and as an agent of social and cultural change (Jie, 1988). While various scholars agree that competition is the name of the game in the 21st Century and that technology is the ultimate means for achieving competitive advantage, perceptions of the meaning of technology vary among different disciplines. As our world becomes increasingly more technology-driven and global competition continues to intensify, the technology available to a firm will be required to become more sophisticated. Higher levels of sophistication are achieved through technological innovation that is effectively managed. But, to effectively manage technological innovation, a clearer understanding of technology is required.

Technology is the enabler of resource efficiency and provider of better solutions for farmers to enable them to meet the needs of the world. Agricultural technology is not a lifestyle choice - it fulfills the right to food by ensuring that all people have the capacity to feed themselves with dignity and value. There are some technologies employed in post harvesting operations. The Institute of Post Harvest Technologies (IPHT) in Sri Lanka has introduced some technologies like, Pulse De huller machine for production dhal, Hand Operated Maize Sheller, Pedal operated husk blower, Fluidized bed dryer for parboiled paddy, Multi Crop Dryer, Domestic level parboiling vessel, Rice flaking machine, Small scale batch dryer ( [www.ipht.lk](http://www.ipht.lk)).

## Technology adoption

The role of technology in shaping tomorrow's business operations is a distinctive one. It has become a fundamental enabler in creating and maintaining a flexible business environment. The transformation trajectory is a moving target, shaped by the fundamental changes in the competitive business world; management's challenge is to continually adapt the organizational and technological capabilities to be in dynamic alignment with the chosen business vision.

In the past, the value of a company was assessed largely on the basis of its capital and physical assets such as land, building, equipment, and inventory. Today, the real value of a company is much more than the value of its physical assets or its simple accounting net worth. Technology adds value to the assets of a company resides in the heart of the company's people and its technological systems. It is the primary factor in wealth creation which involves more than just money; it may encompass factors such as enhancement of knowledge, intellectual capital, effective exploitation of resources, preservation of the natural environment, and other factors that may contribute to raising the standard of living and quality of life.

The technologies applied in a business are the technological assets of that business namely hardware, software, brain ware, and know-how. They constitute the collective knowledge and technical capabilities of the organization, including its people, equipment, and systems. (Khalil, 2000). It can be defined as all the knowledge, products, processes, tools, methods, and systems employed in the creation of goods or in providing services (Khalil, 2000). Technology is the practical implementation of knowledge, a means of aiding human endeavor. It is common to think of technology in terms of hardware, such as machines, computers, or highly advanced electronic gadgets. However, technology embraces a lot more than just machines. There are several technological entities besides hardware, including software and human skills.

Technological considerations include both external factors, such as the nature of technological change and competitor activity, and internal factors such as technological capabilities. Three key questions can be used to stimulate the development of a business strategy, each involving technological considerations:

- What basis?—The selection of a generic strategic approach (e.g., cost leadership, differentiation or focus)
- Which direction?—Identification and selection of alternative directions (e.g., do nothing, withdraw, consolidation, market penetration, product development, market development, integration, diversification)
- How?—The identification and selection of alternative methods (e.g., internal development, acquisition, joint development).

Technology defines with several concepts by many scholars time to time. Rogers (1995) define, “Technology is a design for instrumental action that reduces the uncertainty in the cause-and-effect relationships involved in achieving a desired outcome. A technology usually has two components: (a) a hardware aspect, consisting of the tool that embodies the technology as a material or physical object, and (b) a software aspect, consisting of the information base for the tool. It includes tools and machines, and the mechanisms or activities by which people seek to change or manipulate their environment.”

Based on these understanding of technology, try to know how to transfer it for our purposes. The transfer of technology is taking important part on the adoption of technology. At the micro level, nation's newly industrialized countries such as Taiwan and Singapore have followed a special niche strategy to become competitive in world markets. (Khalil, 2000). Taiwan relied heavily on its nationals, trained overseas, to transfer the technology. Acquiring knowledge through people can be a very effective means of transferring technology. It can take place by two general stages. One is technology relocation and other is technology absorption. Thurow (1992), predicts that in the twenty – first century there will be high – tech and low – tech final products, but almost every product in every industry – from fast food to textiles – will be produced with high – tech processes.

Technology adoption includes two dimensions as **Components** referred to as technoware, humanware, inforware, and orgaware (Sharif, 2002). Technoware is includes the object-embodied technologies like artifacts, equipment, and machines. It is the physical

device that amplifies human capacities for producing different kinds of goods and/or services through various types of transformations (Sharif, 2002). Humanware is the person-embodied art-of-doing- type skills technologies, like ingenuity, craftsmanship, and talent is what people do with their technoware by applying acquired qualifications such as education and training, experiences, and problem solving ingenuity. It includes tacit knowledge, and is used for transformation activities as well as managing various processes/functions. Without relevant humanware, any technoware is simply non-functional or useless (Sharif, 2002). Inforware refers to the record-embodied know-what-why-how-type facts technologies is the primary source of human creativity related to a tool-based task, and includes facts, systemized concepts, and profession specific guidelines. It also includes the codified knowledge and information base related to a transformation operation. Good inforware enables quicker skill development and also results in savings in terms of time and resources utilized for any organized endeavor (Sharif, 2002). Orgaware is the institution-embodied work procedural *methods* technologies, like operational steps and techniques and refers to the social structure framework of organized work such as systemized methods for integration and coordination of activities and resources for achieving the desired goals of an organization in producing goods and providing services. Orgaware also includes the practiced procedures of value networking and cooperation among various stakeholders (Sharif, 2002). Each of the four components of technology, which are embodiment forms of intelligence-based created resources, interact dynamically and are required simultaneously by a firm for the successful performance of any desirable transformation. Therefore, technology can be defined as intelligence based created resources. To effectively adopt these components the capabilities of adaptation is much integrated. To transforming, acquiring, vending, modifying and innovative capabilities.

Porter (1985) stated “technological innovations can have important strategic implications for individual companies and can greatly influence industries as a whole.” In every organization, technology is the mechanism that performs or enables the necessary value-added transformations for the

production of goods and services. Over the years, many organizations have increasingly come to accept technology as the means for managing productivity driven competitive advancement in the global economic environment. This relentless effort toward increased productivity gain has resulted in the never ending need for technology resources to become more sophisticated. Continuous technological resource innovations (for better mechanisms and for better means) are, therefore, indispensable for competition (Sharif, 2002).

According to those findings the knowledge and the adoption of technologies are having relationship with each other. Therefore, the following hypothesis was developed;

**H1:** perceived systematic use of knowledge of a firm is significantly and positively related to firm's performance.

## Research Methodology

This research was an explanatory study. The study design was the survey method using a structured self-administered questionnaire as the research tool and unit of analysis was done with the individuals. The likert scale was used for the statements attained for the variables ranging from strongly disagree to strongly agree. The researcher was interested in investigating whether knowledge relates to technology adoption among a sample of 28 rice millers in Ampara district of Eastern Province of Sri Lanka. So the type of study was correlation rather than causal. Since, this study attempted to analyze the relationship between the two variables. Sample was selected from Chamber of Commerce, Ampara in 2011 registration.

## Measures

**Measuring Knowledge:** the perceived degree of knowledge in an organization was operationalized into six dimensions i.e. Knowledge about customers, Knowledge about best practices/ effective processes, Knowledge about our own competencies and capabilities, Knowledge about our own products and services, and Knowledge about emerging market and

technology trends and knowledge about competition. (Skyrme and Amiden, 1997). The questionnaire assesses the various dimensions of knowledge and technology adoption. There were 14 items represented those dimensions. A 5-point Likert scale from Strongly Disagree to Strongly Agree is used to evaluate the responses.

**Technology Adoption:** the perceived degree of technology adoption was operationalised into two dimensions as, components of technology and capabilities of technology.(Sharriff, 2002). 21 items were represented the above dimensions and measured by 5-point Likert scales.

## Reliability Analysis of the Questionnaire

A reliability analysis was done to check the inter item consistency reliability. The Cronbach's Alpha was measured. Accordingly, the Cronbach's alpha reliability coefficients of the independent and dependent constructs were obtained. Accordingly, the alpha value for knowledge and technology adoption showed a good reliability. Knowledge was 0.764, and the Technology Adoption was 0.732. Both constructs display good internal consistency.

Descriptive measures the mean value for knowledge and Technology adoption shows that the respondents generally agree to the statement with the mean value of 3.29 with the standard deviation of 0.273 and technology adoption has a mean value of 3.01 with the standard deviation of 1.17. These shows the rice millers are satisfied with their knowledge and the adoption of relevant technologies which they use in producing and marketing the product. The correlation between knowledge and technology adoption was not significant where  $r = -.140$  at 0.47 significant level. Hence the finding shows knowledge has no influence on technology adoption. According to the regression result the model fit was explains thus  $R^2$  is 0.20 which shows that 0.2% of technology adoption is explained by knowledge. That is, the knowledge has no much influence in technology adoption.

## Hypothesis Testing

The most common policy in statistical hypothesis testing is to establish a significance level, denoted by  $\alpha$ ,

and to reject  $H_0$  when the  $p$  – value falls below it. Since  $p$  value  $0.477 \leq \alpha$ , so the null hypothesis is rejected and the alternative hypothesis is accepted as the  $p$  value  $\leq \alpha$ . Therefore statically conclude that there is no association between Knowledge and Technology adoption. Hence, this means there is a negative relationship between knowledge and technology adoption. Also the results in correlation table support this hypothesis. Thus, the relevant knowledge of identifying customers, market, and technology is not a predictor of adopting new technologies.

## Conclusion

Changes in the customers view point of the product, continuous adaptation of the market environment are major challenges for transforming the business. Eventhough the knowledge about customers, knowledge about best practices, knowledge about own competence and emerging market are have no much of influence on technology adoption, they may be the working experience, capital resources and other supports in the industry might have more influence on investing more money on new advanced technology based operational system. Because technology adoption requires developing its employees, developing the working methods and procedures and other work related adoption expenses with money and efforts. The study has been done on the rice millers in Ampara district and for the evaluation purposes the mean, correlation, regression and standard deviation has been used.

There are so many factors influencing on the transformation of business not only the factor of knowledge. Successful adoption of technology is depends on many factors. Rice millers are adopting technology and having outside regional market with the capacity of inputs. Assistance from government (institutional and economical) support is much required for effective transformation. Rice mill industry is an important sector to develop the region. Therefore future researchers find out other factors which contribute to upward movement of transformation of their business. However, this research will help to other people who are involving in the agribusiness supply chain, policy makers and

others. And authority people will have to be up to a tack that exercising regarding the future use of technologies for speed transformation of the business.

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