Role of Internet of Things (IoT)

In Promoting Sustainable Economic Growth in India 2047

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R. DIVYABHARATHI & DR. M. MEHAR BANU

Abstract

Rapid growth in the manufacturing sector has triggered to explore the potentials of Wireless Sensor Networks (WSN) and Internet of Things (IoT) which paves the way to escalate the efficacy of manufacturing. Industries implemented IoT in various domains starting from purchase of raw materials till customer service and support. IoT is considered as a key technology of the industrial revolution 4.0 and this provides a promising prospect to build influential services and applications for manufacturing. Further, it also provides an interactive relation between smart machines to share the data and information, which is essential for the complex systems to take a decision on the real-time working environment. In this paper, we reviewed the impact of IoT for a sustainable development, especially with regard to the manufacturing dimensions. This will further put forth the current scenario of IoT in manufacturing and this leads the researchers for pioneering their research towards the cyfibre integrated manufacturing.

Keywords; IOT, Smart Machine, Wireless Sensor Network (WSN), Manufacturing

Introduction

During the Industrial Revolution, the manufacturing industry dominated the economics of both nations and businesses. The need for cyber - integrated manufacturing is urgent in this new era of the fourth industrial revolution. IoT-enabled smart manufacturing enables interactive relationships amongst intelligent machines to communicate data and information, which is necessary for complex systems to make decisions regarding the real-time working environment. The primary strategy to achieve sustainability in manufacturing, from a day-to-day perspective, is to increase resource and energy efficiency. As a result of recent technical advancements and intense worldwide competition, business enterprises face numerous difficulties. Innovation in their processes and products is essential to overcoming these problems and achieving sustainable development in the future. IoT is the technology on which companies are concentrating to advance the development of their products and procedures. Although IoT is expanding rapidly across a number of industries, including healthcare, energy conservation, smart retail, agriculture, etc., its adoption in the manufacturing sector is still in its infancy.

Rejeesh et al. (2017) the manufacturing approaches to natural fibre-reinforced composites are leaning toward novel and innovative routes for sustainable production. However, the biocomposite production from natural fibre reinforcement depends on various factors like interfacial fibre to matrix adhesions, length and contents of fibre, treatments of fibres, and the dispersions of polymers into the fibre structure. In this regard, researchers are becoming more interested in biocomposite manufacturing research and so coir fibre-reinforced composites are also getting significant consideration. Diûerent

researchers have reported promising results on developed coir fibre-reinforced biocomposites from diûerent perspectives (thermal, mechanical, morphological, and so on) have suggested that coir fibreboards could function as an alternative flame retardant material to other plywood.

Olveira et al. (2018) Investigations on short coir fibre-reinforced composites via full factorial design have proposed a design involving short coir fibre reinforced with epoxy thermosets through applying uniaxial pressure, characterized in terms of flexural properties, impact strength, and physical properties. The same study has further claimed that the perceived impact resistance and flexural modulus were satisfactory when 35% fibre volume with 375 g m^{-1} (fibre grammage/density) was used, although they found higher flexural strengths at 300 g m^{-2}.

Ayrilmis et al. (2011) White, Coir fiber reinforced polypropylene composite panel for automotive interior applications, Fibers Polym reported coir fibre reinforcements with polypropylene (PP) in the presence of a coupling agent and found that the increased volume of the fibre loading negatively influenced the internal bonding strength and water resistance of the bio-composites. They also found an optimum fibre loading of coir (60%), up to which the tensile and flexural strengths of the composites increase.

The third industrial revolution, sometimes known as the "digital revolution," which saw the development of electronics like the transistor, microprocessor, telecommunication, and computer, continues to be a key influence on the production process. A coconut tree can produce 50 to 100 coconut fruits per year. The photographs of the coconut palm tree, coconut fruits, coconut husk, and coir fiber

morphology are provided in Fig. 1. The extracted fiber from the husks of the nut-shell is termed coir fiber.

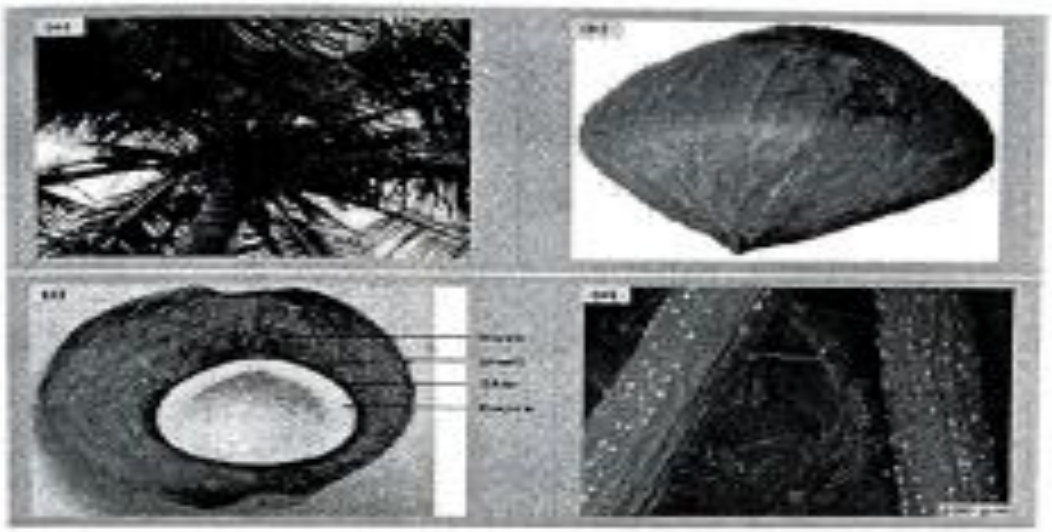
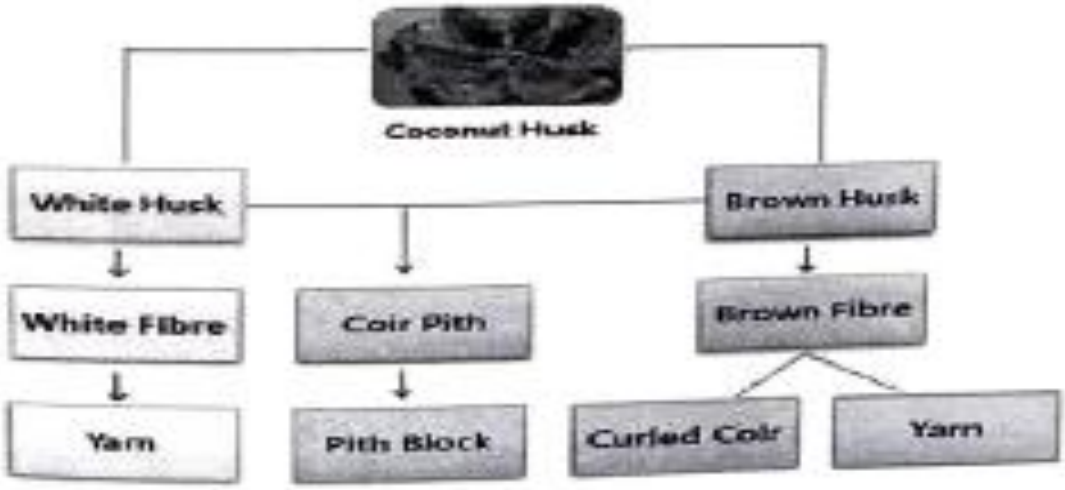


Fig. 1 Photographs showing the physical and morphological structure of coconut plants and coir ûber: (a) coconut plants in Bangladesh (digital photographs taken by Muhammad Abu Taher); (b) coconut fruits (digital photographs taken by Muhammad Abu Taher); (c) cross-section of coconut fruits; (d) SEM image of coir ûber. Adapted with permission from Elsevier (c).43 Copyright, Elsevier 2004 (c).

Production Process

The Product flow from the raw material is depicted in the chart below:



Objectives and Activities

The focus of the project was on coir wet processing technologies, and was directed towards the research and transfer of technologies that would encourage further demand for traditional coir products, for example, coir fibre, yarn and floor coverings (mats, matting and carpets) by improving quality and enhancing appeal. The project required that these technologies should be appropriate and cost effective, and would upgrade the production of coir and yarn manufacture at village level. A strategy was proposed containing five activities for a period of two years to improve drying, dyeing, softening, and bleaching technologies, as well as the printability of coir mats, rugs and carpets. Drying was implemented in Sri Lanka by the Coconut Development Authority (CDA), while the other activities were located in India, and implemented by the Coir Board of India (CBI) with the close involvement of the Central Coir Research Institute (CCRI), Kalavoor.

The properties of mature coir fibers are as follows:

- 100% naturally originated
- Coir fibers are strong and light
- Coir fibers easily withstand saline water
- Coir fibers easily withstand heat exposure
- Plastic shrinkage is delayed in coir-based materials by controlling the cracks developed at the initial stage
- The usage of coir in composite materials enhances thermal conductivity
- Biodegradability and renewability

- Higher water retention
- Rot-resistant
- Moth-resistant
- Heat insulator
- Have acoustic properties

Development of Coir Industry

The development of coir industry has all along been in areas where there is a concentration of coconut trees and availability of coconut husk. Historically, the coir industry started and flourished in Kerala which has a long coast line, lakes, lagoons and backwaters providing natural conditions required for retting. However, with the expansion of coconut cultivation, coir industry has picked up in the States of Tamil Nadu, Karnataka, Andhra Pradesh, Orissa, West Bengal, Assam, Tripura, Pondicherry and the Union Territories of Lakshadweep and Andaman & Nicobar Islands through the efforts of Coir Board. The production and processing methods in coir industry still continue to be mainly traditional.

Statement of Problem

Modernization was implemented by the coir units in an effort to increase their profitability. The situation was that the majority of coir plants' balance sheets consistently showed a loss amount. The units started implementing new technology to get around this. The impact of technology advancement on wages and productivity, however, has not yet been thoroughly investigated. The impact of modernizing coir units on employers' ability to generate income and the shift in the number of workdays wasn't even an attempt in any of

the current research works. The impact of a change adopted can only be verified when we can associate the same with the other factors. We can say the modernization is helpful in overcoming the difficulties in production and marketing only and only if it has helped in improving the income and work standards. Hence, this study is having the primary aim of filling this lacuna by establishing links between technological change and variables such as wages, productivity, employment based on various dimensions.

Impact of the Coir Industry

- Reasonable value realization for quality Coir Fibre within the cluster itself
- Multiplied investment, turnover and employment in Coir Spinning activity
- Production of value added competitive products and marketing through strengthened marketing linkages (both domestic and export)
- Increased value addition of Coir Fibre, resulting in enhanced income for Fibre manufacturers by minimum 20%, consequently increased income level to the coir workers in Fibre extraction units by minimum 10%.
- Increase in the overall turnover of the cluster by minimum 10%.
- Additional employment of minimum 300 personnel, due to the establishment of new Coir yarn units under convergence.
- Additional investment to the tune of about 3.50 Crores for the establishment of Coir yarn units by entrepreneurs to meet the yarn requirement of CFC.

- Post interventions, the Cluster's export earnings increase by 15%
- Emergence of specialized support service providers and their active involvement in the development process
- Strong linkages among the Cluster members and actors in all levels of the value chain and an established Collaborative setup in place to undertake development initiatives & address common issues.
- Establishment of new units by converging various schemes of State and Central Governments (such as Coir Udyami Yojana, PMEGP, UYEGP, etc.) resulting in additional investments in Coir sector by the cluster members
- 100% Coverage of cluster artisans under social security schemes
- Improved access to financial capital for cluster members

Conclusion

IoT is widely recognized as a new technology that significantly contributes to the development of the coir production sector. It has the ability to incorporate all manufacturing-related parts, including as sensors, processors, communication tools, and actuation devices. This fully integrated smart cyber-physical system creates new manufacturing market and commercial opportunities and sets the path for a new industrial revolution. The manufacturing industry now has a great chance to improve system performance in distributed and globally-connected contexts. Additionally, IoT adoption in manufacturing is still in its early stages, necessitating a signif t

amount of research activity to make the IoT technologies operationally secure and dependable.

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