

**EMBEDDING TRUST FACTOR INTO ICT-
BASED KNOWLEDGE SHARING
FRAMEWORK FOR CASSAVA FARMERS
IN THE INFORMAL ORGANIZATION**

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EMMANUEL FRIDAY OGUNBOR UKPE

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ABSTRACT

The progression of Information and Communication Technology (ICT) has enabled organizations to share knowledge and collaborate from diverse locations with experts; to accomplish organizational tasks. However, the characteristics and dynamics of informal organizations have posed various challenges to good knowledge sharing, especially in a virtual environment. The literature on organizational knowledge sharing has shown that the investigations on different constructs of organizational knowledge sharing indicate that trust has been one of the essential aspects to be addressed. Informal organization, particularly in a virtual environment, may pose additional challenges when the knowledge owner and knowledge seeker do not know each other. Establishing the trust model and embedded into the theoretical framework in a web-based knowledge-sharing platform is demonstrated in this research. A virtual knowledge-sharing environment is facilitated using a web-based portal and mobile devices, so-called Knowledge Acquisition Processing, and Exchange (KAPE). Trust-Based Knowledge Sharing Framework (TBKSF) is established based on the notion to be applied in the informal setting of an organization using KAPE, which encompasses (a) A web-based knowledge of the entire Cassava plantation, (b) Cassava Yield Simulation, (c) Downloadable Cassava production video, and (d) Mobile Application. A survey was conducted, and data were collected from 382 farmers (Cassava and mixed crop farmers) drawn from 7 states, 21 farm communities, and interviewees. Observations were made over three years and nine months. To test the hypothesis and determine meaningful relationships, Cronbach's Alpha, a reliability test; Tukey's Honestly significant difference (HSD) analysis; PLS-SEM, Pearson Product Moment Correlation (PPMC), and all trust acceptable measures (TAM) were used to test the hypothesis. The findings revealed that identifying and managing factors that enable trust in knowledge sharing would positively facilitate knowledge sharing in the informal setting ($\beta = 0.412$, $t\text{-value} = 2.955$). However, there was no significant association between satisfactory factors that validated the knowledge source and acceptance of the knowledge provided ($\beta = -0.062$, $t\text{-value} = 0.518$). Equally, a trust model (integrating all acceptable trust measures) can be built on a computational knowledge-sharing platform for informal organizations where workers are unfamiliar with each other ($\beta = 0.436$, $t\text{-value} = 4.258$). Hence, positively, a trust model (integrating all acceptable trust measures (TAM) can be built on knowledge sharing for the informal organization in an informal setting for workers who are not familiar with each other. Furthermore, there was a significant relationship between KAPE, a knowledge-sharing platform, and an increase in Cassava production ($r=0.784$, $p<0.000$). Similarly, there was a significant positive result in farming activities and yield, the using KAPE trust model in knowledge sharing in the rural community of practice amongst cassava growers ($r=0.703$, $p<0.000$) showed a positive relationship between the variables, and the relationship was statistically significant at 1%. The result implies that the adopted trust model (KAPE) positively improves knowledge-sharing activities amongst rural farmers based on trust. Notably, the research findings revealed that trust and the farmers shared cultural values have a beneficial impact on sharing knowledge. Finally, the result shows that the success of any virtual team must be built on trust because it was the strength of trust relationship amongst the farmers that provides the underpinning for their willingness to share and knowledge-sharing effectiveness in these informal agricultural communities.

Keywords: Trust Factor, ICT-Based Knowledge Sharing Framework, Cassava Farmers, Informal Organization.

APPROVAL

This is to certify that this thesis conforms to acceptable standards of scholarly presentation and is fully adequate, in quality and scope, for the fulfilment of the requirements for the degree of Doctor of Philosophy.

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[21 March 2023]

DECLARATION

I hereby declare that the thesis submitted in fulfillment of the Ph.D degree is my work and that all contributions from any other persons or sources are propduly and adequatelyed. I further declare that the material has not been submitted, either in whole or in part, for a degree at this or any other university. In making this declaration, I understand and acknowledge that any breaches in this declaration constitute academic misconduct, which may result in my expulsion from the program and/or exclusion from the award of the degree.

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A handwritten signature in black ink, appearing to read 'E. Ogunbor', written over a horizontal line.

Signature of Candidate:

Date: 21 March 2023

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LIST OF ABBREVIATION

ACM	Association for Computing Machinery
AGRICOLA	AGRICultural Online Access
AGROVOC	Agriculture and Vocabulary
AIMS	Agricultural Information Management Standards
AKIS	Agricultural Knowledge and Information System
BIS	Business Information Services
CIA	Central Intelligence Agency
CIB	Collaborative Information Behavior
CIS&R	Collaborative Information Seeking and Retrieval
CSCL	Computer-Supported Collaborative Learning
CSCW	Computer-Supported Cooperative Work
DB	Database
DBMS	Database Management System
ELIS	Everyday life Information Seeking
FAO	Food and Agriculture Organization
FAO-UN	Food and Agriculture Organization of the United Nations
FMANR	Federal Ministry of Agriculture and Natural Resources of Nigeria
GDP	Gross Domestic Product
HCI	Human Computer Interaction
ICT	Information and Communication Technology
IFAD	International Fund for Agricultural Development
IITA	International Institute of Tropical Agriculture
IK	Indigenous Knowledge

I/O	Input / Output
ISB	Information Seeking Behavior
ISCAR	International Society for Cultural and Activity Theory
ISDT	Information Systems Design Theory
ISP	Information Search Process
IT	Information Technology
ITS	Intelligent Tutoring System
KAPE	Knowledge Acquisition, Processing for Extraction
KB	Knowledge-Based
KM	Knowledge Management
KR	Knowledge Representation
LIS	Library and Information Science
MIS	Management Information Systems
MISQ	Management Information Systems Quarterly
NBS	National Bureau of Statistics
PDA	Personal Digital Assistant
QA	Quality Assurance (process in Software Engineering)
RGT	Repertory Grid Technique
USDA	United States Department of Agriculture
ZPD	Zone of Proximal Development

CHAPTER 1

INTRODUCTION

Overview of Chapter One

Chapter one introduces and presents the motive for the study at hand. The term trust in knowledge sharing in organizations has been discussed frequently in various institutions and knowledge management literature. However, trust in knowledge sharing, in the unstructured, informal organization has not been completely expounded in academic research. This is one of the motivating factors for this study. The chapter presents the justification for this research using the research aim, objectives, research questions, scope, research approach and significance of the study. In addition, vital areas, such as Communities of Practice (CoP), Virtual communities, interpersonal trust and impersonal trust; informal and formal organization, the implication of a knowledge-sharing framework among the Cassava farmers in the rural agricultural communities were examined. The chapter concludes with a summary of the structure of the dissertation.

1.1 Introduction

Knowledge is powerful, but it is even more so when shared. It enables people to network, improve their performance, and grow as professionals. Effective knowledge sharing techniques enable the reuse and regeneration of knowledge at the individual and organizational levels, which is essential to modern-day economic success. Knowledge sharing allows your company to save money on training while capturing and retaining know-how. The efficiency of a company's knowledge-sharing efforts can improve customer service, bring new products to market, and save operating costs. Kabiru (2015) argued that the knowledge and practices of farmers built through long

years of experience ought to be organized, stored, and shared with the aid of Information and Communication Technology. Efforts have been made in the past about building knowledge repositories and ontologies to capture and share knowledge (Kim, Mukhopadhyay *et al.*, 2016) where specific individuals are deemed to be an expert in a particular field collaborated with the knowledge engineer. In a situation where more than one individual is involved in the knowledge sharing in building community knowledge, the element of trust must be in place as it is one of the essentialities in knowledge sharing. There are several studies related to trust in knowledge sharing within formal and informal organizations.

Maclean, Harvey *et al.* (2016) defined a formal organization as “an organization with a fixed set of intra-organization procedures and structures”. A formal organization has clearly defined rules and guidelines to determine and limit employees’ actions, covering day-to-day responsibilities. They have determined goals, objectives and policies needed for direct guidance, covering specific responsibilities, and work-related performance standards for every position. According to Woolley *et al.* (2015) employee position in relation to other staff or an employee rank in the eyes of the law. Similarly, employees’ rights are limited to their job description, they can also participate in other work-related activities when permitted; however, the policy forbids an employee from participating in activities that are detrimental to the organization as listed in the employee handbook. Also, there is strict adherence to the principle of organization: Culture is considered to be the self-sustaining pattern of behavior, which helps to determine how things are done. Organizational culture is its basic personality; that defines and identifies the essence of how employees interact and work; thus, every member must adhere to the culture (Woolley *et al.*, 2015). Furthermore, transmitting messages and information in real-time is essential to an

organization's survival. As a result, it is essential to define and standardize these communication channels. Equally, there is a system of direct chain of command, usually from the top to the bottom of the organization. All critical decisions are made by senior management, then passed down through junior management to other employees.

Informal Organization is defined as “an intertwining social structure, that guides how individuals work together, organized by a collective of norms, professional and personal connections which govern the procedure of communal work-related activities” (Harvard Business Review, 2002; as cited in Maclean *et al.*, 2016). The informal organization consists of a self-motivated set of personalities with a high emotional foundation of motivation, communities of practice and of common interests. The informal organization balances the explicit structures, strategies, and procedures of the formal organization. In contrast, informal organization is characterized by one of the advantages of informal organization, is the ability to quickly respond to changing situations and evolve constantly. It is primarily grass-root-based; the employee is mainly drawn together by common interests, which could be personal and communal concerns. It has no clear boundaries and is much harder to recognize. The setting involves insider knowledge, being one with intimate knowledge, privileged material (non-public), hidden secrets or otherwise ambiguous information or knowledge of operation (Singh, Singh & Pande, 2013). Also, the informal organization features fewer layers of senior management and management. In this structure, employees are authorized and expected to take control of a wide range of managerial decisions within their daily routines. Furthermore, employees in an informal organization are usually bonded by trust, which is the threshold condition for cooperation and efficient communication. In the organisation, there is communal

decision-making, a group or allemployees's decision-making process, that agrees to support a consensus that benefits the whole. Furthermore, essential for conditions that change rapidly and are not fully understood, the power and process are decentralized, which enables employees adapt to changes whenever it occurs.

Existing research has mainly focused on interpersonal attraction, culture, social group interrelation and knowledge sharing in organized settings (Curry and Kirwan, 2014; Chun-Ming *et al.*, 2015) but trust, influence in a Web-based knowledge sharing for an informal organizational structure have been mainly overlooked. In particular, some studies (Evans, 2013; Osmani, Zaidi, and Nilashi, 2014) highlighted the significance of trust, but there is no consensus on how to integrate it effectively in an informal organization. In the subsequent subsections, the study on Community of Practice is essential as it is a form of informal organization that shares common values and goals.

In the context of this study, the virtual environment, which focuses on the cassava farmers; in rural settings where most of these farmers do not know each other, creates challenges to collaboration and knowledge sharing. The advancement of information and communication technologies has facilitated effort in knowledge sharing, moving teamwork away from constituting the same location to include teams anywhere. This study addresses the social aspects of knowledge sharing in virtual settings, concentrating on trust amongst the cassava farmers in various rural communities. The study proposes a theoretical model which theorizes a connection between trust, willingness to share, collaboration, and knowledge sharing effectiveness in virtual settings. In this study, trust is categorized into a propensity to trust members in the community of practice and ability to trust using ICT tools, because some knowledge sharing activities within these rural agricultural settings

require face-to-face interaction, which is swayed by interpersonal trust and online communication; the trust is influenced by impersonal trust (Pangil and Chan, 2014).

Trust is perceived as imperative in knowledge sharing or in a knowledge-based economy precisely when the need to co-create value or collaborate with individuals outside traditional business boundaries (Salloum *et al.*, 2018). Blau (1964) presents trust as a lubricant for managing complexity, uncertainty, and all associated risks in every form of communication. The scholar comments further; that the “Just trust me!” statement of yesteryears is woefully unacceptable in today’s business, interpersonal and impersonal relationships. This study believes that the foundation of trust is essential in every aspect of relationships, especially in the virtual communities of informal organizations.

Primarily, studies show that the existence of any virtual community depends mostly on members’ level of commitment to knowledge-sharing activities, and the trust factor is found to be a vital precondition for a positive task outcome (Pangil and Chan, 2014; Alsharo, 2015). Trust behavior can be exhibited at three different levels: willingness to trust (refers to a wide-ranging trusting approach), interpersonal trust (refers to trust between individuals who know each other) and impersonal trust (refers to indirect trust relationships; without personal contact) (Salehan *et al.*, 2018) Based on literature review, trust is reasoned to progress from impersonal towards other interpersonal forms, and the implication of trust in any virtual community, depends on the degree of virtuality (Salehan *et al.*, 2018). Above all, trust has been used to explain individual participation in knowledge sharing activities, where knowledge-based trust, identification and quality of contribution matter (Alsharo, 2015). In short, this study believes that trust is a non-negotiable attribute. It is critical to operate in an informal organization of the virtual community to ensure effective knowledge sharing activities.

Knowledge sharing among the cassava farmers in Nigeria is the core interest of our investigation in this study. Ukpe and Mustapha (2016) asserted that the knowledge and practices of farmers' have sustained humans for thousands of years, and this knowledge that resides in tacit ought to be organized, documented and shared with the future generation. Other studies (Abdulsalam *et al.*, 2016; Oparinde *et al.*, 2016) show that agriculture researchers ignore the rural farm communities in acquiring and developing crop knowledge, with the assumption that knowledge is completely generated by scientists in the university laboratories, distributed by extension staff for farmers' adoption. These assumptions and other impressions make it difficult for the most important knowledge in crop propagation, the tacit knowledge and other knowledge resources in the community, to be integrated with the rural knowledge due to improper knowledge gathering and sharing (Nelson, 2015).

Knowledge sharing in the agriculture domain is vital to ensure farmers understand and comprehend the realities of various effective methods to produce Cassava crops. Nigerian farmers, particularly the cassava farmers are suffering from limited information on the entire cassava plantation process, including post-harvest information (Ofuoku, 2015). Thus, it is essential to impart knowledge and stimulate knowledge sharing among the farmers to ensure adequate knowledge for effective production and management of the Cassava crop. Knowledge Management (KM) has gradually been embraced in Nigeria's higher institutions and businesses due to the perceived benefits (Ojo, 2016); this study believes that KM should be effectively integrated into other areas, particularly; the informal rural settings. Thus, this research is driven by the principle that knowledge is recognized as the greatest valuable asset for any society (Cerchione *et al.*, 2015) as it has the aptitude to facilitate the