
Exploring Impact of ICT Adoption on Business Performance Outcome of Indian MSMEs

Anupam Gayen¹,

The National Small Industries Corporation Limited (NSIC),
Under Ministry of MSME, GOI

Mousumi Roy²

^{1,2} Department of Management Studies, National Institute of Technology,
Durgapur, Burdwan, West Bengal, India

ABSTRACT

Information and Communication Technology (ICT) has made a complete change in doing business. Micro, Small and Medium Enterprises (MSMEs) are adopting new ICT Technologies and E-business tools to be competitive, improved productivity, efficiency and overall business performance. This paper explores the impact of ICT Adoption on Business Performance outcome from adoption of ICT & e-Business in Indian MSMEs. It is observed that ICT adoption and knowledge management in the organizational level will have significant impact on organizational performance outcome of MSMEs and the impact of ICT adoption on organizational performance is strongly mediated by effective knowledge management.

KEYWORDS

ICT Adoption, Knowledge Management, MSME Business Performance, ICT and E-Business.

1. INTRODUCTION

The current market place is an evolving economy characterized by ever increasing emphasis on competencies. A firm's value is frequently enhanced when the strategy includes an active systematic effort to have automation in customer engagements (Temi et Al, 2007) recognize and capture new market. Technology adoption can be seen as a matrix of business activities organized to plan, produce, price, promote, distribute, and mega market goods, service, and ideas for the satisfaction of relevant customers and client (Helena et al, 2011). There are several studies reflecting the relationship of ICT use and business performance in large companies (Barua et al, 1995; Brynjolfsson et al, 2000). However, the consensus is that ICT investment provides the avenue for utilizing the resources of a firm and creates value for the firm. It evolves from the interplay of the other variables like cycle time, cost, marketing effort and the firm's proactive attitude to incorporate the environmental dynamism into business strategy (Lee, 2001). A perception of firm owner or manager is vital in realizing the strategic importance if ICT use and its close link with financial performance (Amit and Zott, 2001). Strategic technology management entails a broad spectrum of strategic information and provides the strategic advantages to a business to address challenges of the ICT adoption by which it can achieve its goal and become sustainable (IGbaria et al, 1995; Premkumar et al, 1999; Mirchandani, 2001). Technology acceptance Model has been widely used to access various facets of users' acceptance of technology-based-innovations such as web based geographical information system, social networks, information-technology decisions and across a wide array of service sectors with eventual inclusion of constructs to the original model over time (Davis, 1989; Chau and Hu, 2002; Hernandez et al., 2008; Peng et al., 2012; Sarkani et al., 2013; Zahid et. al., 2013; Pantano and Corvello, 2014).

2. IMPORTANCE OF KNOWLEDGE MANAGEMENT

The business world is getting more and more aware of the importance of knowledge management where ICT has become a fundamental pillar. Performance of a business organization is raised when the strategy gives emphasis on the organization's ability acquiring and managing knowledge based resources. Extent of knowledge management is moderated by ICT adoption, as technology promotes human connectivity, access to new knowledge, and knowledge transfer. In order to meet the emerging challenge in the new economy, MSMEs require an active and systemic effort to organize and capture new knowledge ICT has a very critical role. Enterprises with more positive focus on ICT adoption will outperform less focused enterprises. Effective knowledge management is possible when an enterprise is confident with the use of ICT. Business performance outcome is conceptualized as improvement of internal and external performance of the firm, which is measured by product improvement, employee improvement and new innovation enhancing competitive market position and profitability and firm's value.

Enhanced knowledge management capability seems to lead to business performance outcome such as product improvement, employee improvement and firm innovation. To explore the impact of ICT adoption on knowledge management and subsequently on organizational outcome, the following hypotheses are proposed:

H1: ICT adoption by MSMEs has a positive influence on effective knowledge management; **H2a:** Effective knowledge management has a positive influence on product improvement; **H2b:** Effective knowledge management has a positive influence on employee improvement; **H2c:** Effective knowledge management has a positive influence on firm innovation;

H2: Effective knowledge management has a positive influence on business performance outcome;

H3a: ICT adoption by MSMEs has a positive influence on product improvement;

H3b: ICT adoption by MSMEs has a positive influence on employee improvement;

H3c: ICT adoption by MSMEs has a positive influence on firm innovation;

H3: ICT adoption by MSMEs has a positive influence on business performance outcome.

3. RESULTS AND DISCUSSION

Confirmatory factor analysis was conducted to establish the measurement of the constructs in the mode. Results show that the selected model fits well: the minimum fit function chi square is 246.49 (d.f.=165, $p < 0.01$); NFI=0.987; CFI=0.988; RMSEA=0.055 with the 90% confidence interval. Construct reliability was assessed using composite reliability. In the study all the constructs displayed satisfactory levels of reliability, as indicated by composite reliability ranging from 0.81 to 0.92 (Table 1). Similarly all the Cronbach's alphas were greater than 0.70 (ranging from 0.82 to 0.91) satisfying the minimum criterion for internal constancy. AVE values obtained were greater than the minimum value of 0.50 supports for convergent validity check, which has been achieved in this work (ranging from 0.56 to 0.74). All the factor loadings were significant (t-values greater than 4.86) and were significantly related to their respective constructs, further supporting convergent validity of the constructs.

Table 1: CONSTRUCT RELIABILITY

Construct Indicators	Standard Factor Loading	CR	AVE
Product Improvement		0.85	0.59
Substantial abilities inProduct Development	0.75		
ConsiderableEngineering Abilities	0.68		
Well Developed ProductionSystem	0.72		

Substantial Skills in terms of Personnel Development	0.83		
Employee Improvement		0.81	0.56
Have a great understanding of Technology	0.76		
Try to continuously improve firm's process, product and service	0.69		
Believe that firm's improvement is their responsibility	0.81		
Have abilities to analyze critically their work process	0.72		
Try to develop Skill in finding better ways of doing the job	0.69		
Firm Innovation		0.87	0.74
Select new approaches to process, products and Services	0.71		
Select new aspects to process, products and services	0.68		
Effective Knowledge Management		0.84	0.69
Integrate different sources of Knowledge	0.76		
Convert knowledge into plans of action	0.72		
Acquire knowledge about Stakeholders	0.69		
Exchange knowledge with business stakeholder	0.78		
ICT Adoption		0.86	0.63
Includes new technology for logistics and delivery	0.82		
Includes new technology for Finance	0.75		
Includes new technology for purchasing and procurement	0.74		
Includes new technology for operations, processing and assembly	0.78		
Includes new technology for marketing and sales	0.84		
Includes new technology for after sales service	0.89		

The discriminant validity was evaluated based on the estimated correlation between the constructs (Gold et al, 2001). All the estimated correlations were significantly lower than 0.90, the suggested cut-off providing the evidence of distinctness in construct content and hence the existence of discriminant validity (Table 2).

Table 2: CORRELATIONS BETWEEN CONSTRUCTS

	1	2	3	4	5
Process Improvement	1				
Employee Improvement	0.71	1			
Firm Innovation	0.67	0.72	1		
Effective Knowledge Management	0.78	0.79	0.82	1	
ICT Adoption	0.77	0.80	0.65	0.72	1

Note: All correlations are significant at the 0.01 level (Authors own findings)

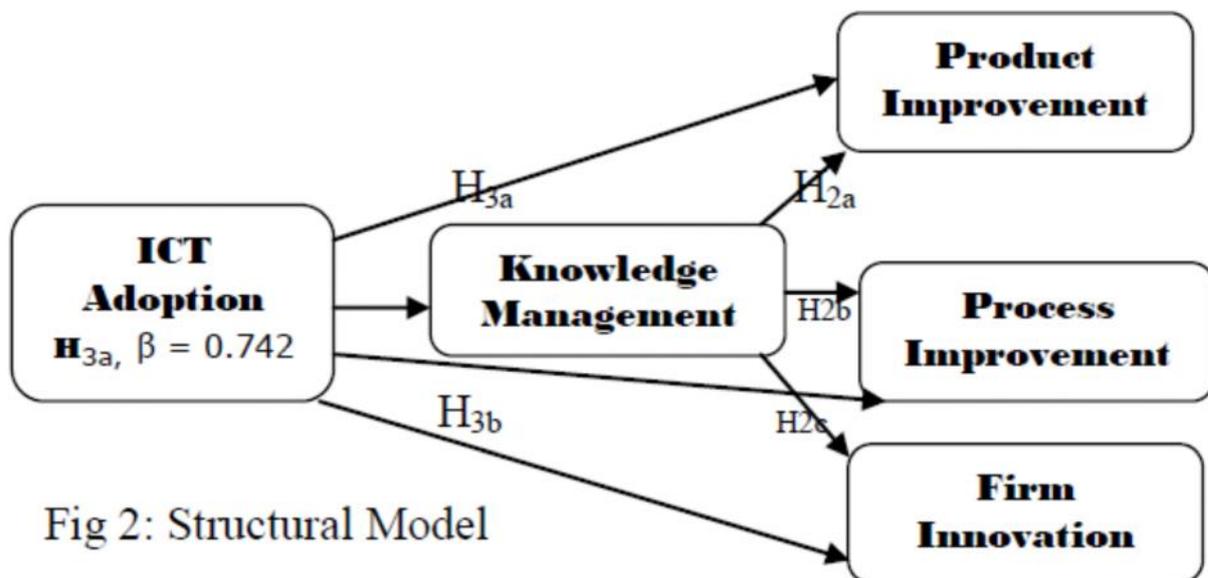


Fig 2: Structural Model

Two sub-models related to the proposed conceptual model were created to explore the relationship between the constructs (ICT adoption, knowledge management and organizational performance conceptualized by product improvement, operational process improvement and firm innovation). The direct impact of ICT adoption on organizational outcome was examined in the first model and in the second sub-model, the impact of knowledge management on organizational outcome was explored. Finally the proposed conceptual model was tested where both the ICT adoption and effective knowledge management were viewed as antecedents of organizational performance outcome (Table 3). The results of the first sub-model (1) reveal that there is positive link between ICT adoption and process improvement, product improvement and firm innovation (=0.704, 0.719, 0.682, respectively, $p < 0.01$). The sub-model 2 supports a strong positive impact of knowledge management on the three dimensions of organizational performance (=0.680, 0.672, 0.650, respectively, $p < 0.01$) (Fig. 3). Sub-model 1 is preferred to sub-model 2 as reflected in the chi-square difference ($\chi^2 = 31.09$, d.f.=1, $p < 0.01$) indicating ICT adoption has a significantly stronger positive influence on organizational outcome. The proposed conceptual model was preferred to sub-model 1, as revealed from the chi-square difference ($\chi^2 = 103.097$, d.f.=84, $p < 0.01$).

TABLE 3: STRUCTURAL MODELS

Model : ²	d.f.	NFI	NNFI	CFI	SRMR	RMSEA
Sub-model 1: 169.884*	81	0.956	0.967	0.971	0.058	0.078
Sub-model 2: 138.778*	80	0.962	0.974	0.979	0.040	0.056
Conceptual model: 231.875*	164	0.975	0.984	0.989	0.044	0.059
Note: * p<0.01						

In the proposed conceptual model it was hypothesized that top management support will have a direct positive influence on knowledge management of an organization (H1), which was supported by the results ($\beta=0.710$, $p<0.01$). It is believed that effective knowledge management by ICT adoption will have positive impact on performance of an organization (H2a-2c and H3a-3c). For H2a, H2b and H2c, results showed that effective knowledge management had strong influence on three sub-dimensions of organizational performance outcome ($\beta=0.820, 0.705, 0.740$, respectively, $p<0.01$). Thus, H2a, H2b and H2c were supported. For H3a, H3b and H3c results revealed that ICT adoption has a strong positive influence on the three sub-dimensions of organizational outcome-process improvement, employee improvement and firm innovation ($\beta=0.612, 0.675, 0.610$, $p<0.01$)(Table 4).

The overall goodness-of-fit indexes of conceptual model revealed that it fits well. It contained the all of the findings specified in the sub-models and as per chi-square difference test the conceptual model proved to be the best of three nested models with 164 degrees of freedom ($\chi^2=103.097$, d.f.=84, $p<0.01$). ICT adoption and knowledge management in the organizational level will have significant impact on organizational performance outcome of MSMEs. However the impact of ICT adoption on organizational performance is strongly mediated by effective knowledge management.

TABLE 4: PATH ANALYSIS & STANDARDIZED REGRESSION ESTIMATES

Hypothesis	Path coefficients
H1: ICT adoption ---> Effective knowledge management	0.710*
H2a: Effective knowledge management --->product improvement	0.820***
H2b: Effective knowledge management --->employee improvement	0.705**
H2c: Effective knowledge management ---> firm innovation	0.740*
H3a: ICT adoption ---> product improvement	0.612*
H3b: ICT adoption --->employee improvement	0.675*
H3c: ICT adoption ---> firm innovation improvement	0.610*
*p<0.001, **p<0.01	

4. CONCLUSION

The findings of the present study suggest that knowledge management has become a key component of positive organizational outcome in MSMEs where the role of ICT adoption is very crucial. Our conceptual model hypothesized that organizational performance would be positively influenced by effective knowledge management.

5. REFERENCE

- [1] Amit, R. & Zott, C., 2001. Value creation in e-business, Strategic Management Journal, 22, 493- 520.
- [2] Barua, A., Kriebel, C.H. & Mukhopadhyay, T. , 1995. Information technology and business value: an analysis and empirical investigation, Information Systems Research, 6(1), 3- 23.

-
- [3] Brynjolfsson, E., & Hitt, L., 2000. Beyond Computation: Information Technology, Organizational Transformation and Business Performance, *Journal of Economic Perspectives*,14(4),23-48.
- [4] Chau, P.Y.K., 1996. An empirical assessment of a modified technology acceptance model,*Journal of Management Information Systems*, 13(2), 185–204.
- [5] Davis, F.D., 1989. Perceived usefulness, perceived ease of use, and user acceptance of information technology, *MIS Quarterly*, 13(3),319–339.
- [6] Helena, C., Susana, G., Susana, D.& Cruz-Machado, V., 2011.Green and Lean Paradigms Influence on Sustainable Business Development of Manufacturing Supply Chains, *International Journal of Green Computing*,2(2), 45-62.
- [7] Lee, C.S., 2001. Modeling the business value of information technology, *Information and Management*, 39,191- 210.
- [8] Mirchandani, A.A. & Motwani, J., 2001. Understanding small business electronic commerce adoption: an empirical analysis, *Journal of Computer Information Systems*, 70–73.
- [9] Premkumar, G. & Margaret, R., 1999. Adoption of new information technologies in rural small businesses, *Omega*, 27(4), 467-484.
- [10] Temi, A.,& Akin, K, 2007. Brand, organization identity and reputation: SMEs as expressive organizations: A resources-based perspective. *Qualitative Market Research: An International Journal*, 10 (4), 416 – 430.