

**ANTECEDENTS OF DIGITAL INNOVATION IMPLEMENTATION  
AND ITS IMPACT ON FIRM PERFORMANCE**

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AND ITS IMPACT ON FIRM PERFORMANCE**

by

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## CERTIFICATE

This is to certify that the thesis entitled “**Antecedents of Digital Innovation Implementation and its Impact on Firm Performance**” being submitted by **Ms. Shiwangi Singh**, to the Indian Institute of Technology Delhi for the award of the degree of **Doctor of Philosophy**, is a record of bona fide original research work carried out by her. She has worked under my guidance and supervision, and has fulfilled the requirements for the submission of the thesis, which has attained standard requirement for a Ph.D. degree of the Institute. The results presented in this thesis have not been submitted elsewhere for the award of any degree or diploma.

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**(Shiwangi Singh)**

## ABSTRACT

Innovation implementation is essential for improving firms' performance and growth. Extant literature suggests that most firms are unable to get the anticipated results because of failure in the implementation state. Many innovations fail because firms do not have appropriate implementation skills, or they do not consistently use the innovation. To acquire the intended benefits from innovation, firms must implement these effectively.

During the COVID-19 pandemic, many firms implemented digital innovations, and this became key enablers of their success. During the initial stages of the pandemic, various companies implemented digital innovation to assist employees working remotely, smoothing their workflow, and improving their customer outreach. This thesis explores the antecedents of successful innovation implementation in the current digital-innovation context.

The aim is to assess the role of the digital innovation implementation antecedents in improving firm performance against five objectives. First, through an extensive literature review using meta-analysis, the study identifies six strategic antecedents of innovation implementation: absorptive capacity, strategic flexibility, strategic resources, internal entrainment, technology acceptance, and external entrainment. Second, the scale to measure digital innovation implementation was generated using exploratory factor analysis with 204 participants. Third, the significance of the identified antecedents of digital innovation implementation was tested using PLS-SEM with 414 participants. The study finds that absorptive capacity, strategic flexibility, strategic resources, technology acceptance, and internal entrainment have a significant and positive relation with digital innovation implementation. Further, the thesis also aimed to understand the relation of the identified antecedents and firm performance. The analysis finds significant and positive relation of absorptive capacity, strategic flexibility, strategic resources, technology acceptance, and internal entrainment with firm performance. Fourth, the role of digital innovation implementation as a mediator between the identified strategic antecedents and firm performance was studied. The study confirmed that the digital

innovation implementation partially mediates the relation between antecedents and firm performance. There was no mediation effect of digital innovation implementation found between external entrainment and firm performance. Additionally, the impact of the implementation climate as a moderating variable was studied between the antecedents and digital innovation implementation. The moderating effect of implementation climate was only significant for absorptive capacity and external entrainment. Further, the indirect effect of the moderator (implementation climate) and mediator (digital innovation implementation) was studied between the antecedents of digital innovation implementation and firm performance. The analysis shows that the indirect moderation-mediation effect was only established for the absorptive capacity-firm performance and external entrainment-firm performance. Finally, a modified total interpretive structural model (m-TISM) was developed by data collected from expert interviews. The case triangulation confirmed the impact of all the significant antecedents on the model tested.

The present thesis conceptualizes and examines the impact of identified strategic antecedents of digital innovation implementation on firm performance. This thesis extends the extant literature on innovation and digital innovation implementation and confirms the importance of the identified antecedents for successful digital innovation implementation and improved firm performance. The study strengthens the evidence for the resource-based and dynamic-capability approaches in the digital innovation implementation literature. Further, it sets out implications for practitioners, policymakers, and academicians for successful digital innovation implementation.

## सार

फर्म के प्रदर्शन और विकास में सुधार के लिए नवीनीकरण कार्यान्वयन की आवश्यकता है। मौजूदा साहित्य से पता चलता है कि कार्यान्वयन की स्थिति में विफलता के कारण अधिकांश फर्म प्रत्याशित लाभ प्राप्त करने में सक्षम नहीं हैं। कई नवीनीकरण विफल हो जाते हैं क्योंकि फर्मों के पास उपयुक्त कार्यान्वयन कौशल नहीं होते हैं या वे लगातार नवीनीकरण का उपयोग नहीं करते हैं। नवीनीकरणों से इच्छित लाभ प्राप्त करने के लिए, फर्मों को इन्हें प्रभावी ढंग से लागू करना चाहिए।

कोविड-19 महामारी के दौरान, कई फर्मों ने डिजिटल नवीनीकरणों को लागू किया, और ये उनकी सफलता के प्रमुख समर्थक बन गए। महामारी के शुरुआती चरणों के दौरान, विभिन्न कंपनियों ने दूर से काम करने वाले कर्मचारियों की सहायता के लिए डिजिटल नवीनीकरणों को लागू किया जिससे उनके कार्य कुशलता को सुचारू रूप से संचारित किया जा सके, एवं अपने ग्राहक तक आसानी से पहुँच बनाई जा सके। यह थैसिस वर्तमान नवीनीकरण संदर्भ में सफल डिजिटल-नवीनीकरण कार्यान्वयन के पूर्ववृत्त को दर्शाता है।

इसका थैसिस का मुख्य उद्देश्य आठ लक्ष्य की प्राप्ति एवं फर्म के प्रदर्शन को बेहतर बनाने में डिजिटल-नवीनीकरण कार्यान्वयन के पूर्ववृत्त की भूमिका का आकलन करना है। सबसे पहले, मेटा-विश्लेषण का उपयोग करते हुए साहित्य की व्यापक समीक्षा के माध्यम से, यह अध्ययन नवीनीकरण कार्यान्वयन के छह पहलुओं की पहचान करता है : अवशोषण क्षमता, रणनीतिक लचीलापन, रणनीतिक संसाधन, प्रौद्योगिकी स्वीकृति, इक्स्टर्नल एंटरनमेंट, और इन्टर्नल एंटरनमेंट। दूसरा, 204 प्रतिभागियों के साथ खोजपूर्ण कारक विश्लेषण का उपयोग करके डिजिटल-नवीनीकरण कार्यान्वयन को मापने का पैमाना तैयार किया गया था। तीसरा, 414 प्रतिभागियों के साथ आंशिक न्यूनतम वर्ग संरचनात्मक समीकरण मॉडलिंग (पी.एल.एस-एस.इ.एम) का उपयोग करके डिजिटल-नवीनीकरण कार्यान्वयन के पहचाने गए पूर्ववृत्त के महत्व का परीक्षण किया गया था। अध्ययन से पता चलता है कि अवशोषण क्षमता, रणनीतिक लचीलापन, रणनीतिक संसाधन, प्रौद्योगिकी स्वीकृति और इन्टर्नल एंटरनमेंट का डिजिटल-नवीनीकरण कार्यान्वयन के साथ सकारात्मक और महत्वपूर्ण संबंध है।

इसके अलावा, थीसिस का उद्देश्य पहचान किए गए पूर्ववृत्त और दृढ़ प्रदर्शन के संबंध को समझना भी था। विश्लेषण से पता चलता है कि अवशोषण क्षमता, रणनीतिक लचीलापन, रणनीतिक संसाधन, प्रौद्योगिकी स्वीकृति और इन्टर्नल एंटरप्राइज का फर्म के प्रदर्शन के साथ सकारात्मक और महत्वपूर्ण संबंध है। चौथा, पहचाने गए रणनीतिक पूर्ववृत्त और दृढ़ प्रदर्शन के बीच मध्यस्थ के रूप में डिजिटल नवाचार कार्यान्वयन की भूमिका का अध्ययन किया गया। अध्ययन ने पुष्टि की कि डिजिटल नवाचार कार्यान्वयन आंशिक रूप से पूर्ववर्ती और फर्म के प्रदर्शन के बीच संबंध में मध्यस्थता करता है। बाहरी प्रवेश और फर्म के प्रदर्शन के बीच पाए गए डिजिटल नवाचार कार्यान्वयन का कोई मध्यस्थता प्रभाव नहीं था। इसके अतिरिक्त, पूर्ववृत्त और डिजिटल नवाचार कार्यान्वयन के बीच एक मॉडरेटिंग के रूप में कार्यान्वयन जलवायु के प्रभाव का अध्ययन किया गया था। कार्यान्वयन जलवायु का मध्यम प्रभाव केवल अवशोषण क्षमता और बाहरी प्रवेश के लिए महत्वपूर्ण था। इसके अलावा, मॉडरेटर (कार्यान्वयन जलवायु) और मध्यस्थ (डिजिटल नवाचार कार्यान्वयन) के अप्रत्यक्ष प्रभाव का अध्ययन डिजिटल नवाचार कार्यान्वयन और फर्म प्रदर्शन के पूर्ववर्ती के बीच किया गया था।

विश्लेषण से पता चलता है कि अप्रत्यक्ष मॉडरेटिंग-मध्यस्थता प्रभाव केवल अवशोषण क्षमता और बाहरी प्रवेश के साथ फर्म के प्रदर्शन के संबंध के लिए स्थापित किया गया था। अंत में, विशेषज्ञ साक्षात्कारों से एकत्र किए गए डेटा द्वारा एक संशोधित व्याख्यात्मक संरचनात्मक मॉडल (एम-टी.आई.एस.एम) विकसित किया गया था। केस ट्रियनगुलेशन से परीक्षण किए गए मॉडल पर सभी महत्वपूर्ण पूर्ववृत्तों के प्रभाव की पुष्टि की गई।

वर्तमान थीसिस में फर्म के प्रदर्शन पर डिजिटल-नवीनीकरण कार्यान्वयन के पहचाने गए पूर्ववृत्त के प्रभाव की अवधारणा और जांच किया गया है। यह थीसिस नवीनीकरण और डिजिटल-नवीनीकरण कार्यान्वयन पर मौजूदा साहित्य का विस्तार करती है और सफल डिजिटल-नवीनीकरण कार्यान्वयन और बेहतर फर्म प्रदर्शन के लिए पहचाने गए पूर्ववृत्त के महत्व की पुष्टि करती है। अध्ययन डिजिटल-नवीनीकरण कार्यान्वयन साहित्य में संसाधन-आधारित और गतिशील-क्षमता के दृष्टिकोण से साक्ष्य को मजबूत करता है। इसके अलावा, यह सफल डिजिटल-नवीनीकरण कार्यान्वयन के लिए कार्य करने वाले, नीति निर्माताओं और शिक्षाविदों के लिए निहितार्थ निर्धारित करता है।

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## LIST OF ABBREVIATIONS

<b>Abbreviations</b>	<b>Definitions</b>
<b>AC</b>	Absorptive Capacity
<b>ACY</b>	Average Citations per Year
<b>AVE</b>	Average Variance Extracted
<b>BFSI</b>	Banking and financial services institutions
<b>CI</b>	Confidence Interval
<b>CR</b>	Composite Reliability
<b>EE</b>	External Entrainment
<b>EFCS</b>	Employee First Customer Second
<b>FP</b>	Firm Performance
<b>GoF</b>	Goodness of Fit
<b>GS</b>	Google Scholar
<b>h</b>	h-index
<b>HTMT</b>	Heterotrait-monotrait
<b>IC</b>	Implementation Climate
<b>IE</b>	Internal Entrainment
<b>IO</b>	Innovation Orientation
<b>IS</b>	Integration and Support
<b>IT</b>	Information Technology
<b>m-TISM</b>	Modified Total Interpretive Structural Modeling
<b>PLS-SEM</b>	Partial Least Square Structural Equation Modeling
<b>SD</b>	Standard Deviation
<b>SE</b>	Standard Error
<b>SF</b>	Strategic Flexibility
<b>SR</b>	Strategic Resources
<b>SSD</b>	Smart Service Desk
<b>TA</b>	Technology Acceptance
<b>TC</b>	Total Citations
<b>TP</b>	Total Publications
<b>UI</b>	User Involvement
<b>VIF</b>	Variance Inflation Factor
<b>WoS</b>	Web of Science