

**STUDY OF SELECT ISSUES IN  
KNOWLEDGE MANAGEMENT IN NEW  
PRODUCT DEVELOPMENT**

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# **STUDY OF SELECT ISSUES IN KNOWLEDGE MANAGEMENT IN NEW PRODUCT DEVELOPMENT**

by

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## **CERTIFICATE**

The Thesis entitled “**Study of Select Issues in Knowledge Management in New Product Development**”, being submitted by **Mr Sourish Acharia** to the Indian Institute of Technology Delhi, for the award of the degree of Doctor of Philosophy (Ph.D.) is a record bona fide research work carried out by him. He has worked under my guidance and supervision, and has fulfilled the requirements for the submission of this thesis, which has attained the standard required for a Ph.D. degree from the Indian Institute of Technology Delhi. The results presented in this thesis have not been submitted elsewhere for the award of any degree or diploma.

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## ABSTRACT

Today India is one of the leading emerging economies of the world wherein Indian organizations are conducting trade across the world. But, unification of the global markets has not only opened up new opportunities but also has forced Indian companies to compete with international companies. To compete in the global market, Indian companies are creating collaborative network for new product development (NPD) across the globe for higher R&D success. This fundamental shift in the NPD structure has forced Indian organizations to reconfigure their NPD processes and relook into the NPD management practices. Based on the analysis of previous research in context of collaborative NPD, following three research objectives are identified:

- To develop a knowledge management-based collaborative NPD framework that addresses the issue of strategic misalignment between NPD goals and knowledge management (KM) initiatives.
- To develop an understanding and provide an analysis of sources of knowledge-loss (K-loss) in context of NPD.
- To develop an approach for preventing K-loss in context of NPD

The scope of the research is to understand and analyze a few key KM issues in context of NPD process for Indian auto component industry and India telecommunication equipment manufacturing industry.

The study initially focuses on developing a KM framework for NPD which addresses the issue of misalignment of KM initiatives with NPD objectives. Subsequently, to analyze the issue of knowledge loss, a detailed case study has been conducted covering six manufacturing firms, which supply components/system modules to automotive and telecom equipment manufacturing companies. In the study, a total of thirteen sources of K-losses and fifteen K-loss prevention factors are identified. After identifying the factor preventing the K-loss, a framework for effective management of K-loss prevention factors is developed, wherein hierarchical inter-relationship amongst identified factors is analyzed using Total Interpretative Structural Modelling (TISM).

To augment the understanding of K-loss prevention factors, a case study is conducted on four auto components companies. The study analyzes the importance of each factor in managing the K-losses in NPD process by developing a ranking based model for the

factors using FERA methodology. To gain further insights on the strategies to manage K-loss prevention factors, ranking of K-loss prevention factors is developed for three Indian telecom equipment manufacturing companies. The study on Indian telecom equipment manufacturing company helps in analyzing the impact of a different sector on the ranking of the K-loss prevention factors. It is observed that Indian auto component companies' NPD process has larger scope and higher maturity level as compared to telecommunication equipment manufacturing companies' NPD process. Hence, it is logical to separately analyze the relative ranking of K-loss prevention factors for telecommunication companies.

The study is concluded by discussing about the research and its implication from a holistic perspective wherein different facets of the research were synthesized. Significant findings and major contributions made through this research are summarized. Important implications and contributions for the auto component industry and telecommunication equipment manufacturing industry practitioners are also been discussed. The limitation and scope for further research are also been discussed.

**Keywords:** New Product Development, Knowledge Management, Knowledge Loss, Knowledge-Loss Prevention Factors, Indian Auto Component Industry, Indian Telecommunication Equipment Manufacturing Industry, Soft System Methodology, TISM, FERA

## सार

आज भारत दुनिया की प्रमुख उभरती हुई अर्थव्यवस्थाओं में से एक है जिसमें भारतीय संगठन पूरे विश्व में व्यापार कर रहे हैं। लेकिन, वैश्विक बाजारों के एकीकरण ने न केवल नए अवसरों को खोल दिया है बल्कि भारतीय कंपनियों को अंतरराष्ट्रीय कंपनियों के साथ प्रतिस्पर्धा करने के लिए मजबूर किया है। वैश्विक बाजार में प्रतिस्पर्धा करने के लिए, भारतीय कंपनियां उच्च अनुसंधान एवं विकास की सफलता के लिए पूरे विश्व में नए उत्पाद विकास (एनपीडी) के लिए सहयोगी नेटवर्क का निर्माण कर रही हैं। अनुसंधान एवं विकास संरचना में इस मौलिक बदलाव ने भारतीय संगठनों को अपनी अनुसंधान एवं विकास प्रक्रियाओं को पुनः कॉन्फ़िगर करने के लिए मजबूर किया है। सहयोगी एनपीडी के संदर्भ में पिछले शोध के विश्लेषण के आधार पर, निम्नलिखित तीन शोध उद्देश्यों की पहचान की गई:

- एक ज्ञान प्रबंधन आधारित सहयोगी एनपीडी फ्रेमवर्क विकसित करना जो एनपीडी लक्ष्यों और ज्ञान प्रबंधन (केएम) के काम के बीच संरेखण के मुद्दे को संबोधित करते हैं
- एनपीडी के संदर्भ में समझ विकसित करना और ज्ञान-हानि (के-हानि) के स्रोतों का विश्लेषण प्रदान करना
- एनपीडी के संदर्भ में के-हानि को रोकने के लिए एक दृष्टिकोण विकसित करना

अनुसंधान का दायरा भारतीय ऑटो उपकरण विनिर्माण उद्योग और भारतीय दूरसंचार उपकरण विनिर्माण उद्योग के लिए एनपीडी प्रक्रिया के संदर्भ में कुछ महत्वपूर्ण केएम मुद्दों को समझने और विश्लेषण करने के लिए है।

यह अध्ययन शुरू में एनपीडी के लिए एक केएम फ्रेमवर्क विकसित करने पर केंद्रित है जो एनपीडी उद्देश्यों के साथ केएम कार्य के संरेखण के मुद्दे को संबोधित करता है। इसके बाद, ज्ञान हानि के मुद्दे का विश्लेषण करने के लिए, छह विनिर्माण कंपनियों में एक विस्तृत अध्ययन किया गया है, जो मोटर वाहन और दूरसंचार कंपनियों के लिए उपकरणों की आपूर्ति करते हैं। इस अध्ययन में, के-हानि के कुल तेरह स्रोतों की पहचान

की जाती है और पंद्रह के-हानि की रोकथाम संबंधी कारकों की पहचान की जाती हैं। के-हानि को रोकने वाले कारक की पहचान करने के बाद, के-हानि की रोकथाम के कारकों के प्रभावी प्रबंधन के लिए एक ढांचे का विकास किया गया है, जिसमें टीआईएसएम कार्यप्रणाली का उपयोग करके के-हानि को रोकने वाले कारकों के बीच अंतर-संबंध का विश्लेषण किया गया है।

के-हानि की रोकथाम कारकों की समझ बढ़ाने के लिए, चार ऑटो कंपोनेंट कंपनियों पर एक केस स्टडी आयोजित किया जाता है। अध्ययन ने एफएआरए पद्धति का उपयोग करते हुए कारकों के लिए एक तुलनात्मक रैंकिंग आधारित मॉडल विकसित करके एनपीडी प्रक्रिया में के-हानि को प्रबंधित करने के लिए प्रत्येक कारक के महत्व का विश्लेषण किया है। के-हानि की रोकथाम कारकों के प्रबंधन के रणनीतियों पर अधिक अंतर्दृष्टि हासिल करने के लिए, तीन-भारतीय दूरसंचार उपकरण विनिर्माण कंपनियों के लिए के-हानि की रोकथाम कारकों की तुलनात्मक रैंकिंग विकसित की गई है। भारतीय दूरसंचार उपकरण विनिर्माण कंपनी पर अध्ययन के-हानि की रोकथाम के कारकों पर एक अलग क्षेत्र के प्रभाव को समझने में मदद करता है। यह देखा गया है कि दूरसंचार उपकरण विनिर्माण कंपनियों की एनपीडी प्रक्रिया की तुलना में भारतीय ऑटो कंपोनेंट कंपनियों की एनपीडी प्रक्रिया में बड़े पैमाने पर और अधिक परिपक्वता है। इसलिए, दूरसंचार कंपनियों के लिए के-हानि की रोकथाम कारकों की तुलनात्मक रैंकिंग करना तर्कसंगत है।

यह अध्ययन एक संपूर्ण परिप्रेक्ष्य से अनुसंधान और इसके निहितार्थ के बारे में चर्चा करके संपन्न हुआ है। इस शोध के माध्यम से महत्वपूर्ण निष्कर्ष और प्रमुख योगदान पर अध्ययन किया गया है। ऑटो उपकरण उद्योग और दूरसंचार उपकरण विनिर्माण उद्योग के प्रबंधकों के लिए महत्वपूर्ण निहितार्थ और योगदान पर भी चर्चा की गई है। आगे की शोध के लिए सीमा और गुंजाइश भी चर्चा की गई हैं।

कुंजी शब्द : नया उत्पाद विकास, अनुसंधान एवं विकास, ज्ञान प्रबंधन, ज्ञान हानि, ज्ञान निवारण कारक, भारतीय दूरसंचार उपकरण विनिर्माण उद्योग, भारतीय ऑटो उपकरण विनिर्माण उद्योग

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