ANALYSIS OF ISSUES OF INFORMATION SECURITY METRIC IN INDIAN CONTEXT

By

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CERTIFICATE

This is to certify that the thesis entitled '**Analysis of Issues of Information Security Metric in Indian Context'** being submitted by Manmohan Chaturvedi to the Indian Institute of Technology Delhi for the award of the degree of **Doctor of Philosophy (PhD),** is a record of *bona fide* research work carried out by him. He has worked under our guidance and supervision and fulfilled the requirements for the submission of the thesis, which has attained the standard required for a PhD 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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(Manmohan Chaturvedi)

Abstract

The thesis attempts to suggest certain approaches which may lead to a more formal assessment of India's Information Security posture.

Information warfare with its various dimensions is a reality of present day Information society. Defensive strategy to counter the inevitable side effects of a digital economy is essential at national and international level. Concerted efforts at International level have resulted in ITU taking pro-active action on behalf of UNO to suggest comprehensive National Cyber Security framework. This framework throws certain challenges to the national governments to put in place measures stipulated there in. It is difficult to incrementally beef up Cyber Security measures without a metric on the current status and feedback to guide the policy makers towards threat mitigation strategy.

Literature survey confirms the spread of Information Warfare to civil domain from traditional military domain. A target-adversary matrix evolved from these considerations highlights the need for defensive Information Warfare initiative at national level to protect ICT assets in both military and civil (public and private sector) domains. The nature and complexity of the problem demands that key experts connected with India's Cyber Security apply themselves to address this challenge.

To begin with, the researcher has explored the existing approaches to Information Security in India and tried to evolve a suitable template for national level framework through literature survey. Using this basic framework, the researcher has acted as a facilitator to an expert Delphi group, selected from key stakeholders in Indian context, for identification and prioritization of the dimensions and indicators of National Information

Security construct using Delphi ranking methodology. In the next phase, relative weights of these indicators are ascertained using Analytical Hierarchy Process (AHP) methodology.

Alternate view of the inter-relationship amongst identified indicators is attempted using Interpretive Structural Model (ISM) and ***M****atrice d'****I****mpacts* ***C****roises* ***M****ultiplication* ***A****ppliquee a un* ***C****lassment* (MICMAC) and this view is synthesized with AHP results to generate useful insights of practical implication in designing a Cyber Security structure at the national level.

The validation of the research is achieved in two stages. In the first stage; we map the identified indicators with existing components of the Cybersecurity policies of various nations. This provides us the content validity.

In the second stage; we attempt external validation of NISI construct both in terms of Dimensions/Indicators and their relative weights through a survey of a selected expert group during a seminar and through Internet.

The construct of National Information Security Index (NISI) in Indian context is the outcome of this research. Finally, the possible use of NISI to measure India's readiness at national level to secure evolving NGN based telecommunication infrastructure is explored.

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