Development of National Information Security Index

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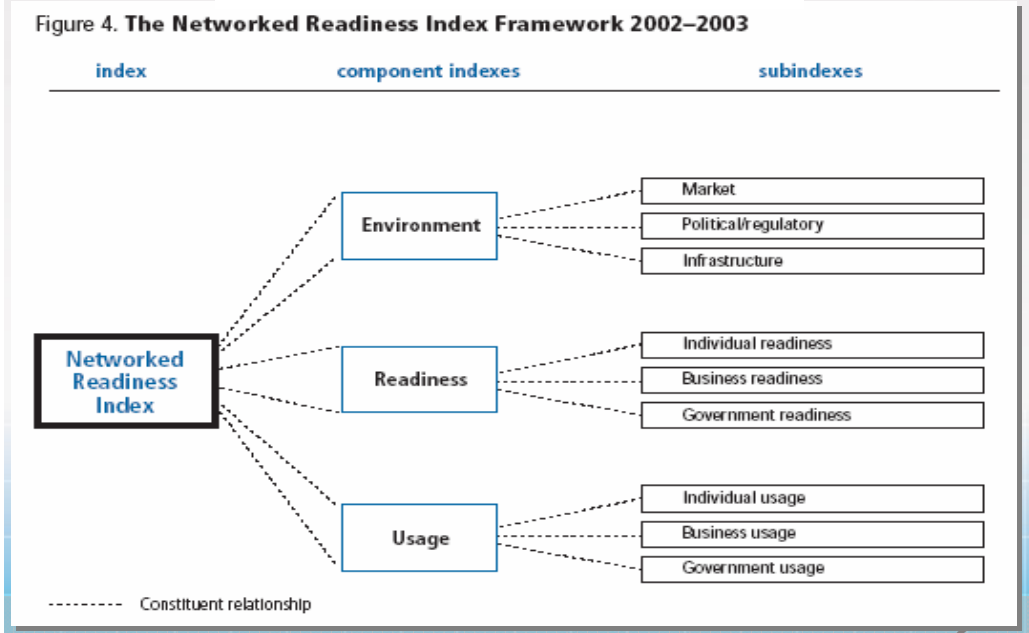
Table of Contents

Background

- **UN, OECD, ITU and other international organizations regularly announce information society index to utilize in establishing and evaluating information policies.**
- **Information society index is utilized as important data for countries to evaluate their information policy performance and select future projects.**

Networked Readiness Index, WEF



ex. The Networked Readiness Index(NRI) of WEF(World Economic Forum) measures level of ICT usage
- contribute countries economic development and gain competitive advantage

Need for Security Index

Need for Information Security Index :

- **To analyze the current level of the internet security**
- **To support the government to develop National IT security policies**
- **Lack of generally accepted measuring standards**

Expected Effects

We expect these effects :

- **Selecting priority order of policy setting and increasing the trust in budget assignment**
- **Providing the policymakers the guidelines to make decisions**
- **Improving the awareness of information security**

Limitations of NISI

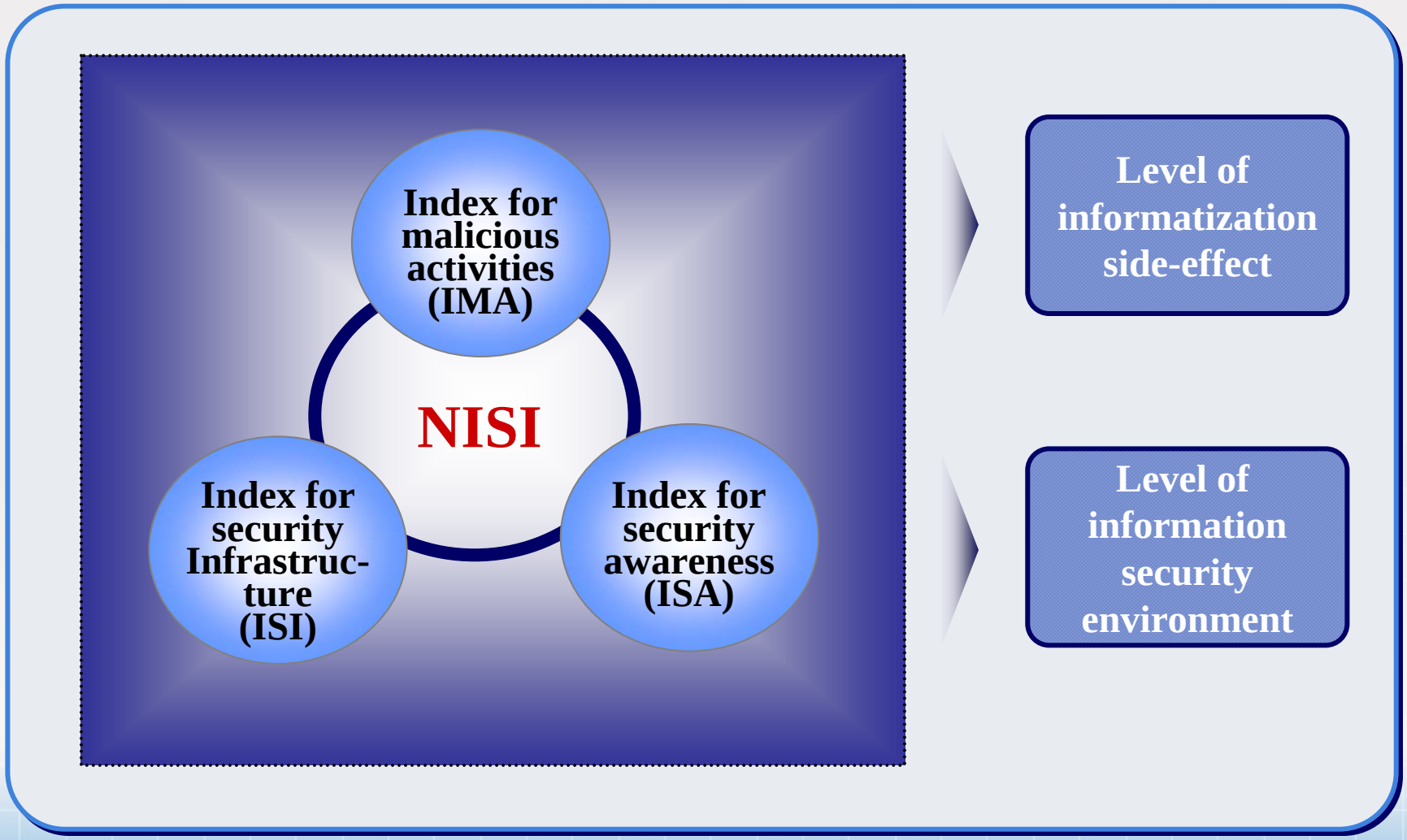
- **First, it is difficult to ensure the establishment of a unified concept of information security phenomena.**
- **Second, it is difficult to select appropriate components that represent information security phenomena.**
- **Third, there is an absolute lack of statistical data, and the reliability of surveyed statistical data is problematic.**

What is NISI ?

- **Information security index is a figure to express the characteristics of a particular group's information security the most clearly**

- **It can be utilized in determining information security policies together, with various statistical data.**

NISI Framework



NISI Structure

Area	Category 1	Category 2	Components
The Level of National Information Security Infrastructure	Security Infrastructure	IT Security Countermeasures	Firewall Usage Rate
			IDS Usage Rate
			Anti-virus Vaccine Usage Rate
			Apply Rate of Software Patch
			Rate of Secure Servers per Population
		IT Security System	Laws and Legislations
			Rate of IT Security Certified Organizations
	Security Environment	IT Security Investment	Rate of National Budget on IT Security
			IT Security Investment Rate
		IT Security Education	Rate of IT Security Expert
			Security Awareness of Citizens
			IT Security Education Introduction Rate
The Level of the Side-Effects of the Information Society	Index for Malicious Activities	Malicious Activities	Leakage Rate of Individual Information
			Rate of Organizations Facing Security Problems
			Rate of Facing Computer Virus
			Rate of Bot Affected PC

Sample of Measurement - 1

Item	Anti-virus penetration rate
Definition	program that stop the function or remove a computer virus program
Model	$\frac{\text{The Number of Anti-virus user}}{\text{The Number of Internet user}} \times 100$
Importance	- Measurement of Anti-virus usage - Grasping of individual information security level

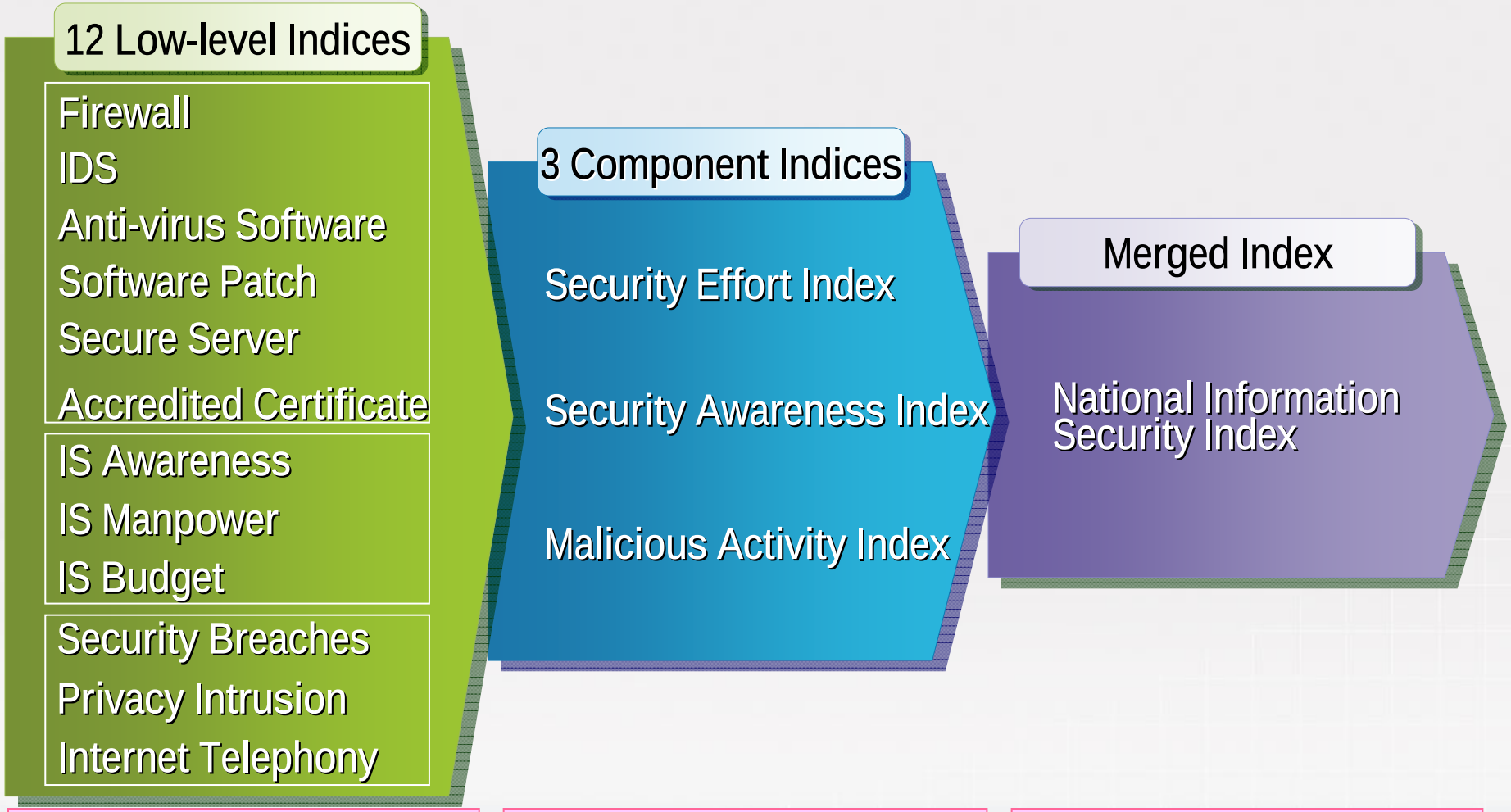
Sample of Measurement - 2

Item	Firewall penetration rate
Definition	computer system that automatically prevents an unauthorized person from access to a computer when connected to a network such as the Internet
Model	$\frac{\text{The number of company using Firewall}}{\text{The number of companies}} \times 100$
Importance	- Measurement of Firewall usage - Grasping of information security level

Sample of Measurement - 3

Item	The rate of specialized information security expert
Definition	The rate of employee at the companies related to information security business
Model	$\frac{\text{The number of Information security expert}}{\text{The number of Information-oriented expert}} \times 100$
Importance	- It is manpower to keep and to develop national information security level - Grasping of how many these people country have.

NISI Generating Process



Direct Calculations from the Data

Applying weights and adjustment factors to the low-level indices

Applying the index generating function to the component indices

NISI Generating Function (1)

Information security level index: $\boldsymbol{H = T + E}$

Dysfunction Index: $\boldsymbol{N}$

T = social effort for the information security society
E = information security environment
N = side-effect of information society

NISI Generating Function (2)

Integration of Indicates at Each Stage

Description					
1st stage	2nd stage (middle category)		3rd stage (low category)		
Total index	Weighted value	Item	Weighted value	Adjustment factor	Item
Information security level (H)	w_{t1}	Information security base index (T)	w_{t11}	α_{11}	Vaccine penetration rate t11
			w_{t12}	α_{12}	Patch penetration rate t12
			w_{t13}	α_{13}	PKI penetration rate t13
			w_{t14}	α_{14}	Firewall penetration rate t14
			w_{t15}	α_{15}	IDS penetration rate t15
			w_{t16}	α_{16}	Security server penetration rate t16
	w_{e1}	Information security environmental index (E)	w_{e11}	β_{11}	The ratio of information security-related budget e11
			w_{e12}	β_{11}	The ratio of specialized information security manpower e12
			w_{e13}	β_{11}	The ratio of the people's security awareness level e13
Information dysfunction level (N)	w_{n1}	Information dysfunction index (N)	w_{n11}	δ_{11}	The ratio of hacking and virus reports n11
			w_{n12}	δ_{12}	The ratio of private information intrusion reports n12
			w_{n13}	δ_{13}	The ratio of spam mail receipt n13

$$H = w_{t1} T + w_{e1} E$$

s.t. $w_{t1} + w_{e1} = 1$, $w_{t1} = w_{e1}$

$$T = w_{t11}\alpha_{11} t1 + w_{t12}\alpha_{12} t2 + w_{t13}\alpha_{13} t3 + w_{t14}\alpha_{14} t4 + w_{t15}\alpha_{15} t5 + w_{t16}\alpha_{16} t6$$

s.t. $w_{t1} + w_{t12} + w_{t13} + w_{t14} + w_{t5} + w_{t16} = 1$,

$w_{t11} = w_{t12} = w_{t13} = w_{t14} = w_{t5} = w_{t16}$

$$E = w_{e11}\beta_{11} e1 + w_{e12}\beta_{12} e2 + w_{e13}\beta_{13} e3$$

s.t. $w_{e11} + w_{e12} + w_{e13} = 1$, $w_{e11} = w_{e12} = w_{e13}$

$$N = w_{n11}\delta_{11} n1 + w_{n12}\delta_{12} n2 + w_{n13}\delta_{13} n3$$

s.t. $N = w_{n1} N$ $w_{n1} = 1$

$w_{n11} + w_{n12} + w_{n13} = 1$, $w_{n11} = w_{n12} = w_{n13}$

Future Work

- **KISA Trying to improve NISI (2008)**
- **Co-work with KISA-ITU expert group(’08~)**
- **Development of Information Security Index**

Thank You!