

国際会議 (IWSE-Mensura2007) 参加報告

2007-12-18

神谷 芳樹

(IPA/SEC, NAIST)



Software
Engineering
Center

Information-technology Promotion Agency, Japan



Empirical
Approach to
Software
Engineering

An Empirical Study of Process Management and Metrics based on In-process Measurements of a Standardized Requirements Definition Phase

標準化された要求定義工程での進行中のプロジェクト計測例

Yoshiki Mitani, Tomoko Matsumura,
Mike Barker, Seishiro Tsuruho,
Katsuro Inoue, Ken-Ichi Matsumoto

*Information Technology Promotion Agency, Japan(IPA)
Nara Institute of Science and Technology(NAIST)
Kochi University of Technology
Osaka University*

EA Guideline Structure

Basic Architecture	Reference Model	EA Products
Business Architecture	Business Reference Model Performance Reference Model	Business Description Document Diamond Mandala Matrix (DMM) Data Flow Diagram (DFD) Work Flow Architecture (WFA)
Data Architecture	Data Reference Model	UML Class Diagram Entity Relationship Diagram (ERD) Data Definition Table
Application Architecture	Service Component Reference Model	Information System Reference Diagram Information System Function Structure Table
Technology Architecture	Technology Reference Model	Network Structure Diagram Software Structure Diagram Hardware Structure Diagram
Project Process Architecture		AsIs Process, Optimize Process, ToBe Process
Project Management Architecture		Earned Value Management (EVM) method Work Breakdown Structure (WBS) method

DMM(レベル0とレベル1)

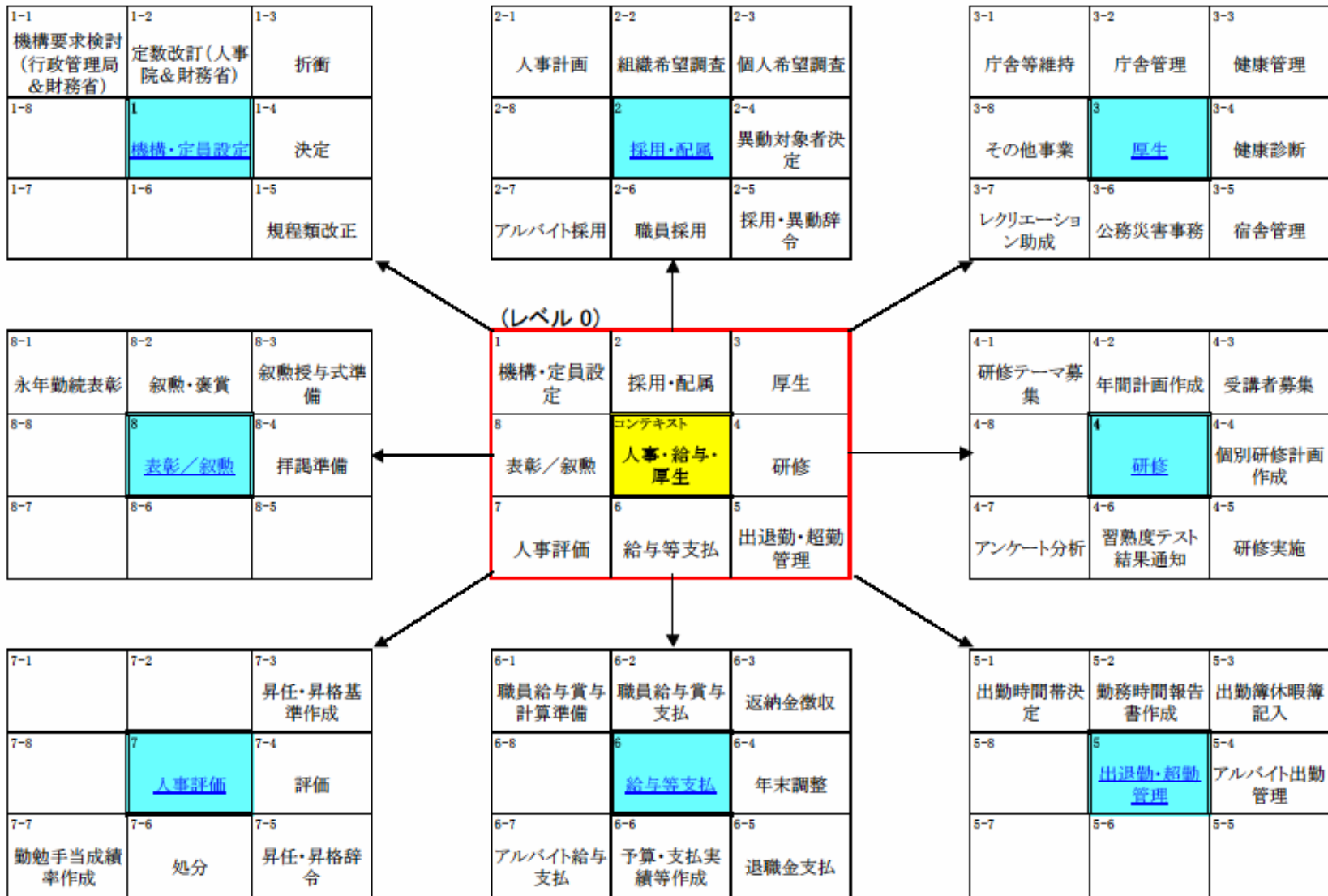


Fig.1-1 Diamond Mandala Matrix (DMM)

Hierarchical structure in max 8 branch ⁴

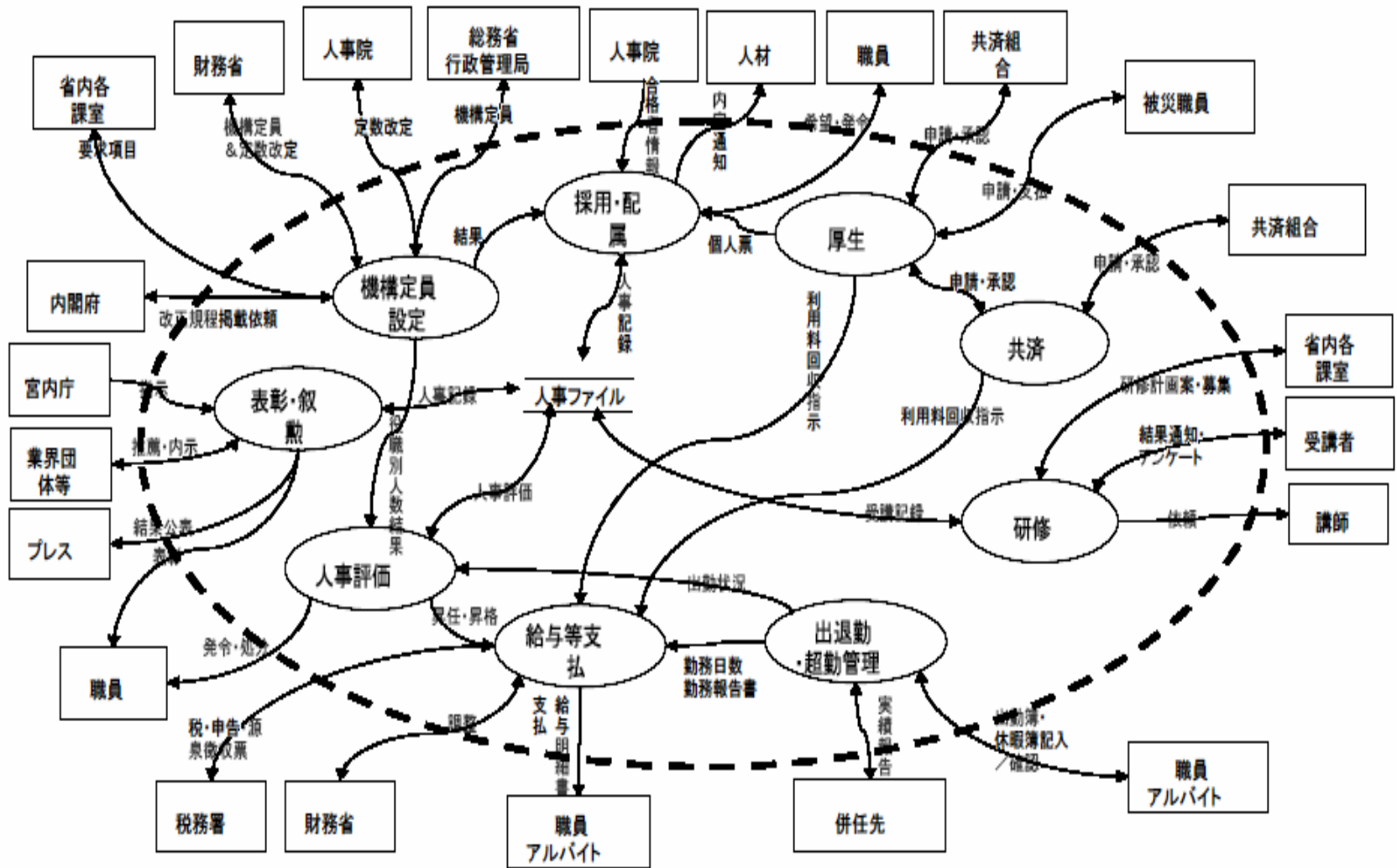


Fig.1-2 Data Flow Diagram (DFD)

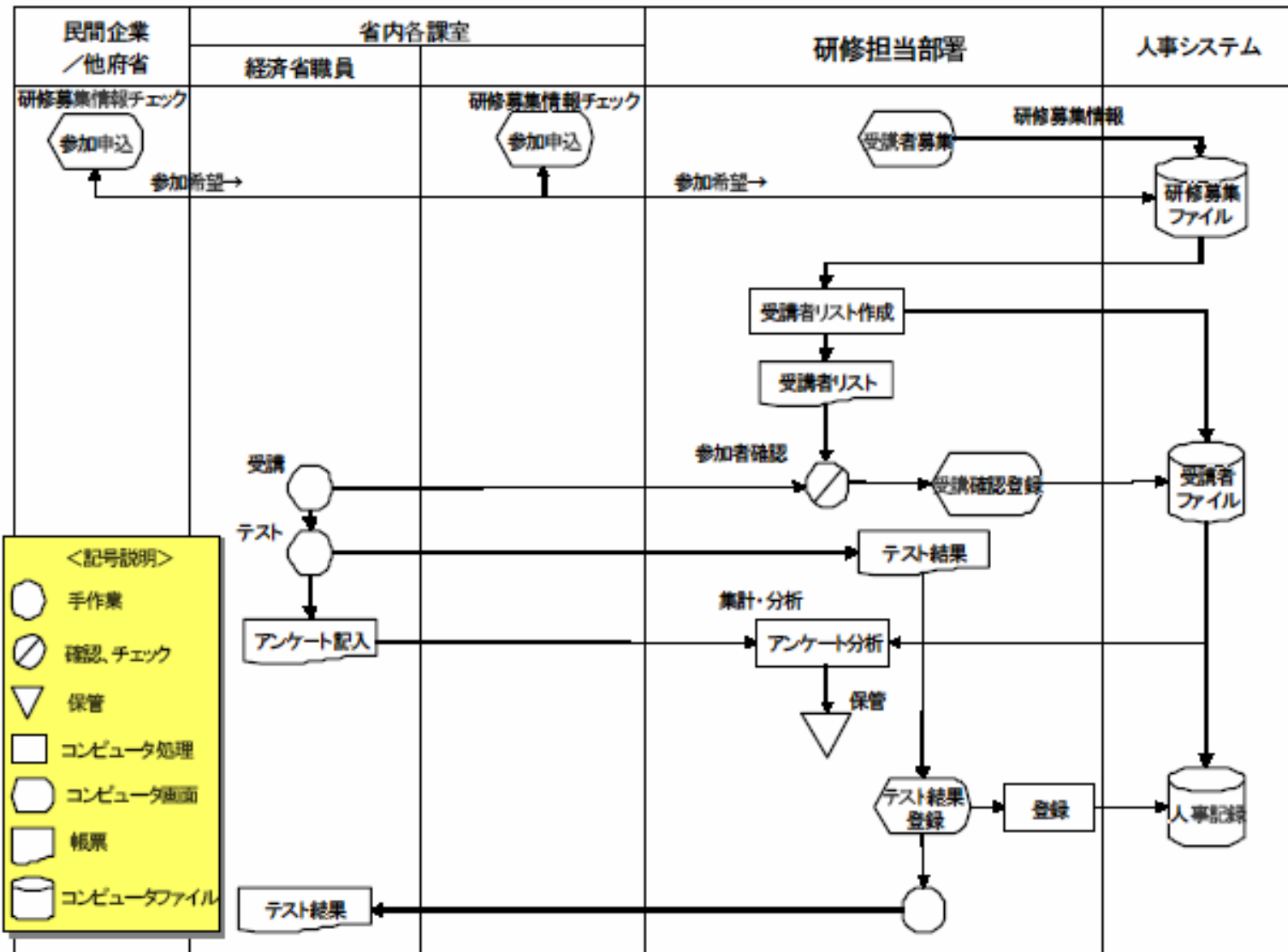


Fig.1-3 Work Flow Architecture (WFA)

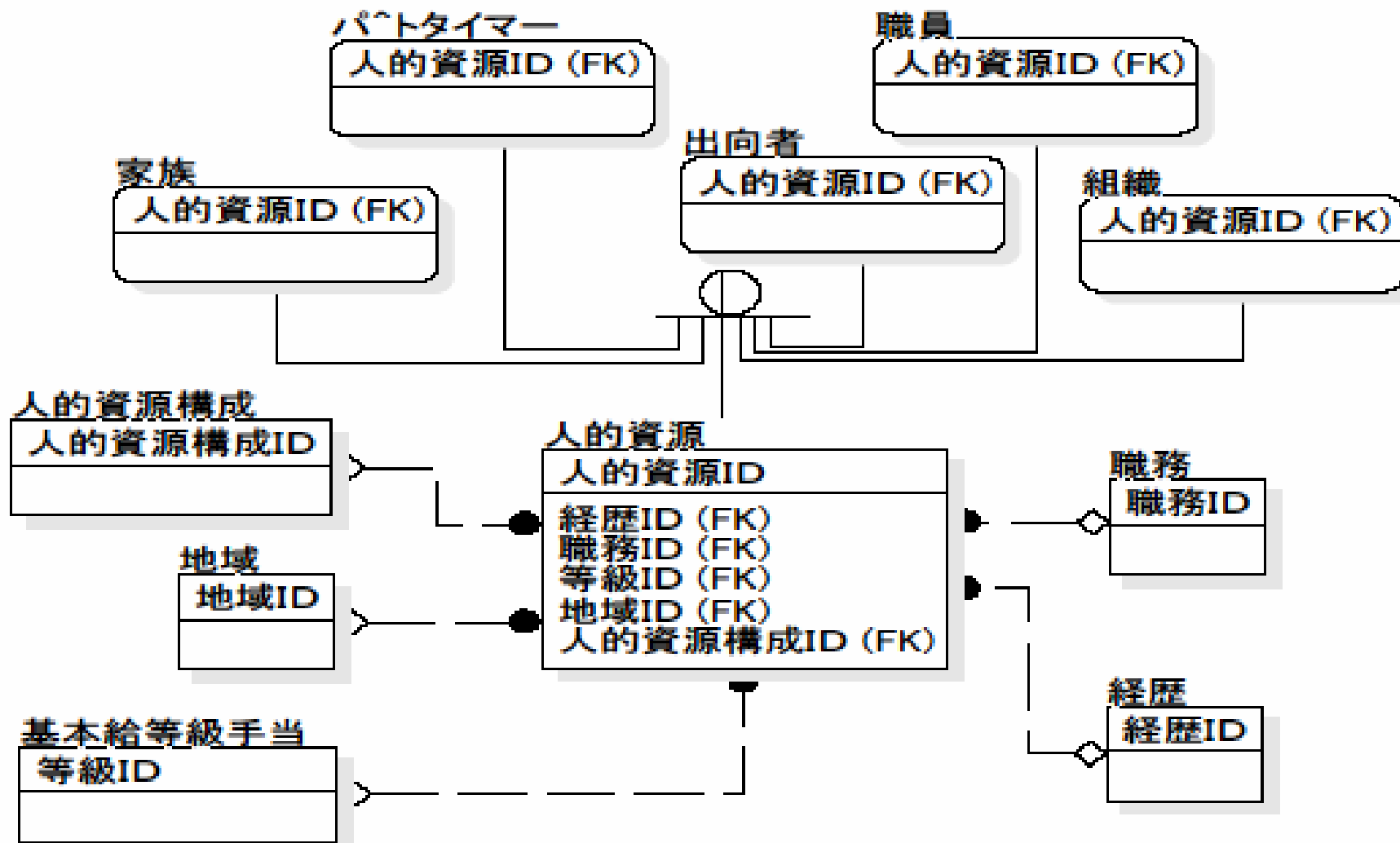


Fig. 1-4 Entity Relationship Diagram (ERD) 7

Table 1 Outcome Diagrams & Management Targets

Target Business	A		B		C		D	
AsIs/ToBe	AsIs	ToBe	AsIs	ToBe	AsIs	ToBe	AsIs	ToBe
Business Description	x		x		x		x	
DMM			x	x			x	
DFD	x	x	x	x	x	x	x	
WFA	x	x	x	x			x	
ERD			x	x			x	
Information System Reference Diagram			x	x			x	
Network System Diagram			x	x				
Software System Diagram			x					
Hardware Structure Diagram			x					

34 kinds of documents including 30 diagrams
Measurement targets are 22 key diagrams

Schedule of Target Project

Work	2006					2007		
	8	9	10	11	12	1	2	3
Extract Issue		→						
AsIs Description		→						
Build System				→				
Renewal Policy				→				
Build System				→				
Review Plan				→				
Build						→		
Optimization Plan						→		
ToBe Description						→		

Target: AsIs and ToBe phase

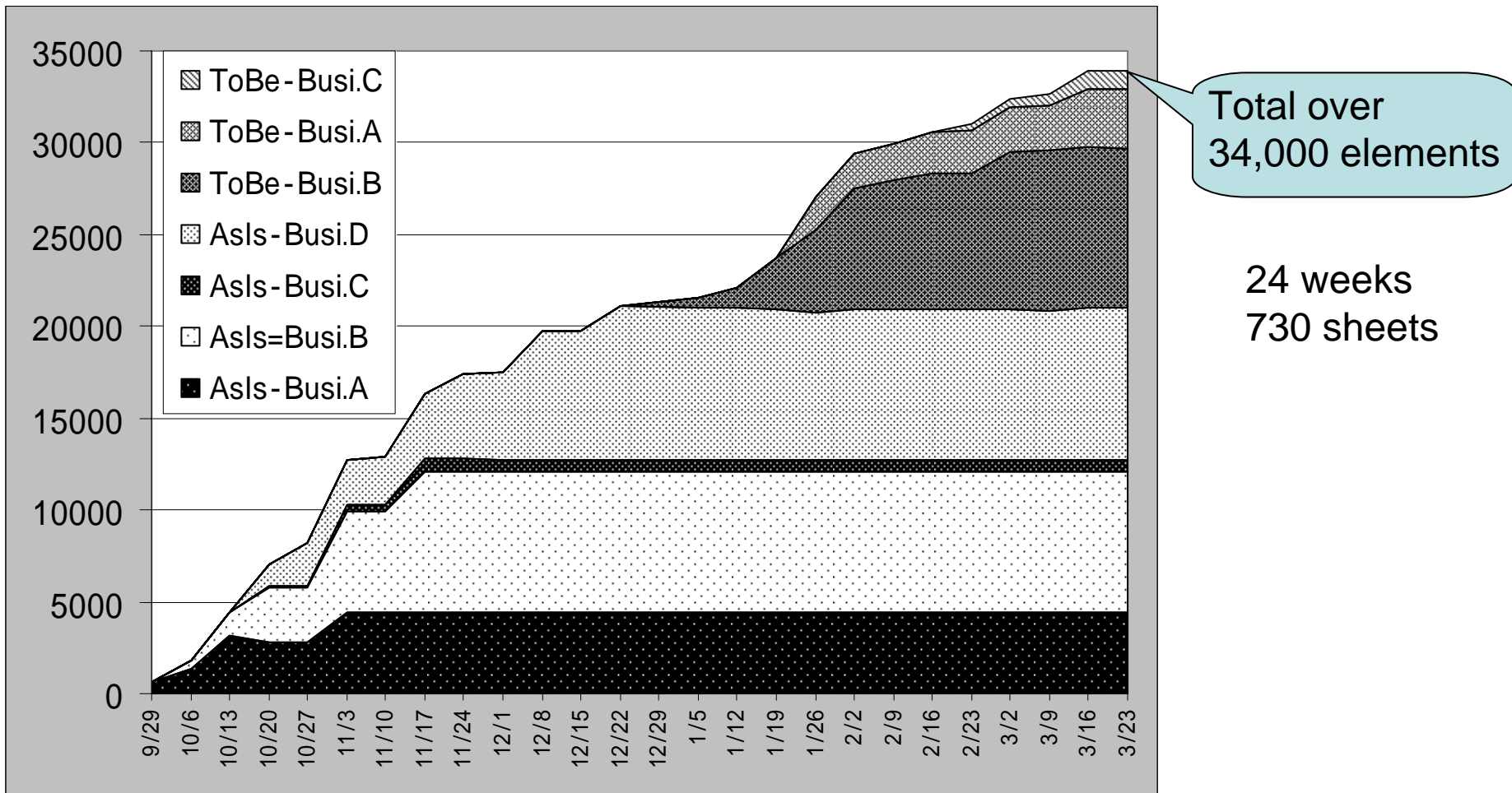


Fig.2 Diagram Elements Stack of all Business

accumulated data for all businesses.

not only the total amount project proceeding process for each business but also description documents amount, working start timing and finished stable situation.

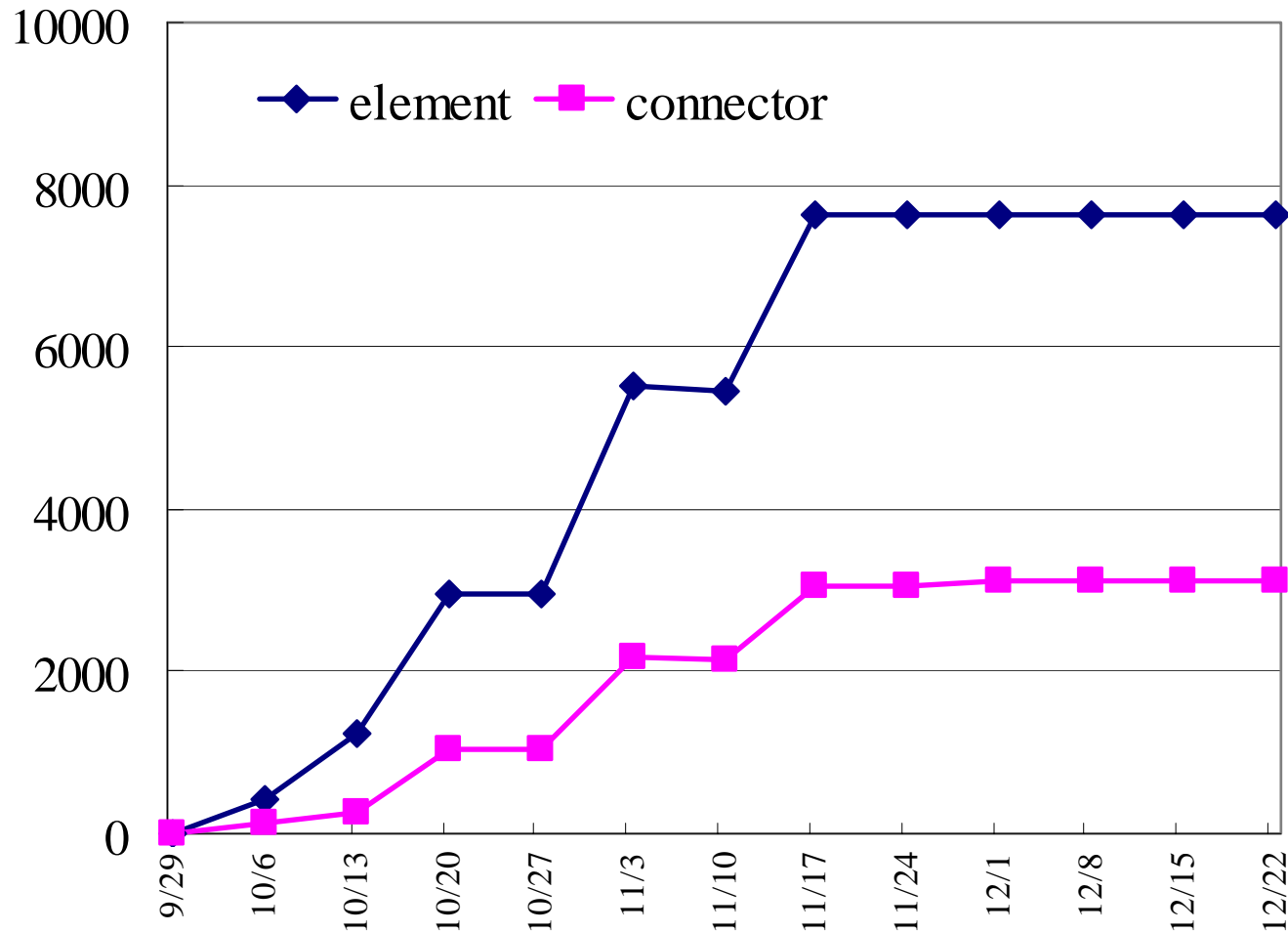


Fig.3 Diagram Elements of Business B (AsIs)

Clearly show each business progress

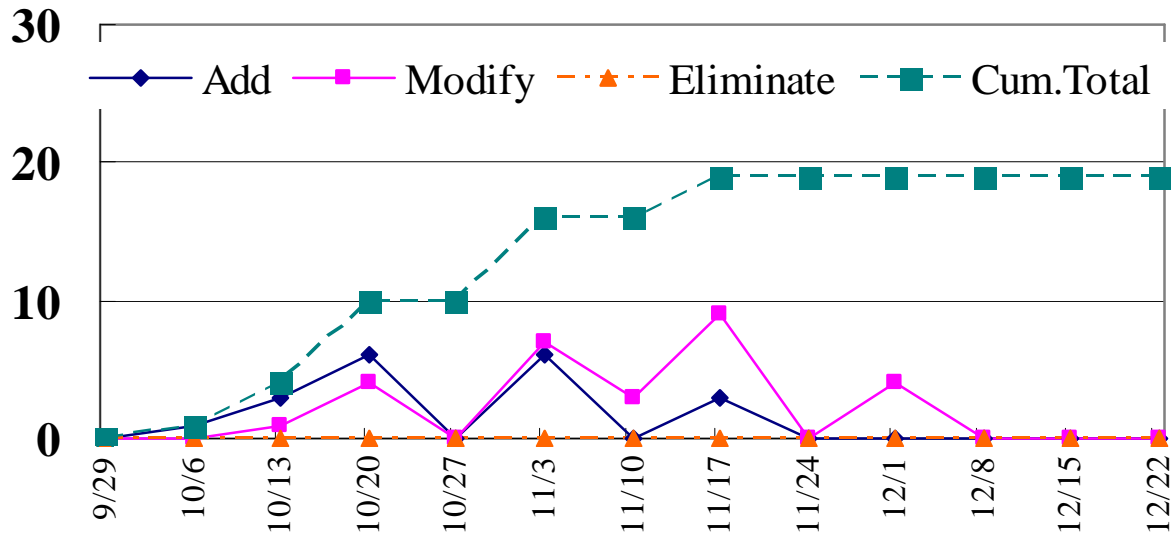


Fig.4 File Number Transition of Business B (AsIs)

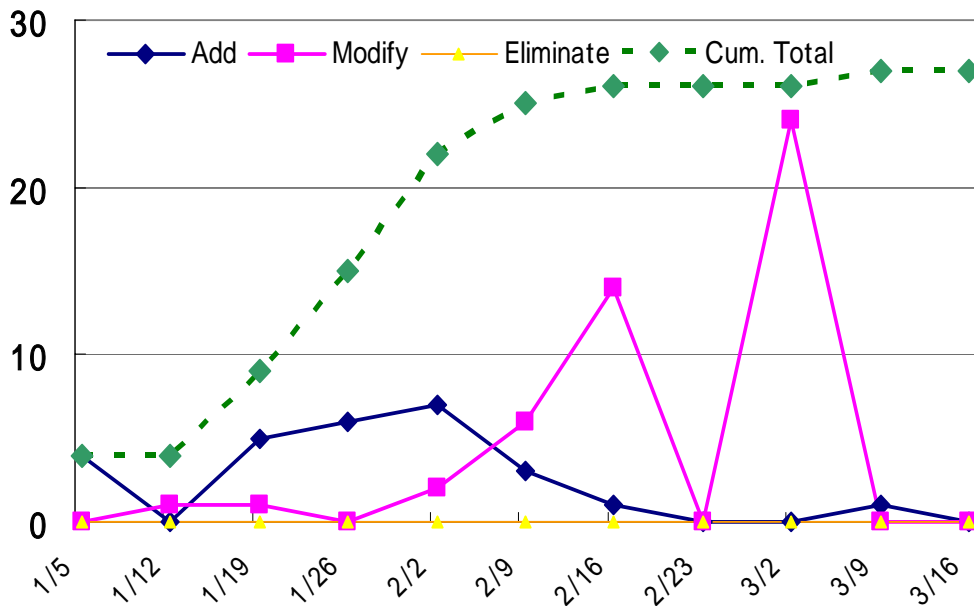
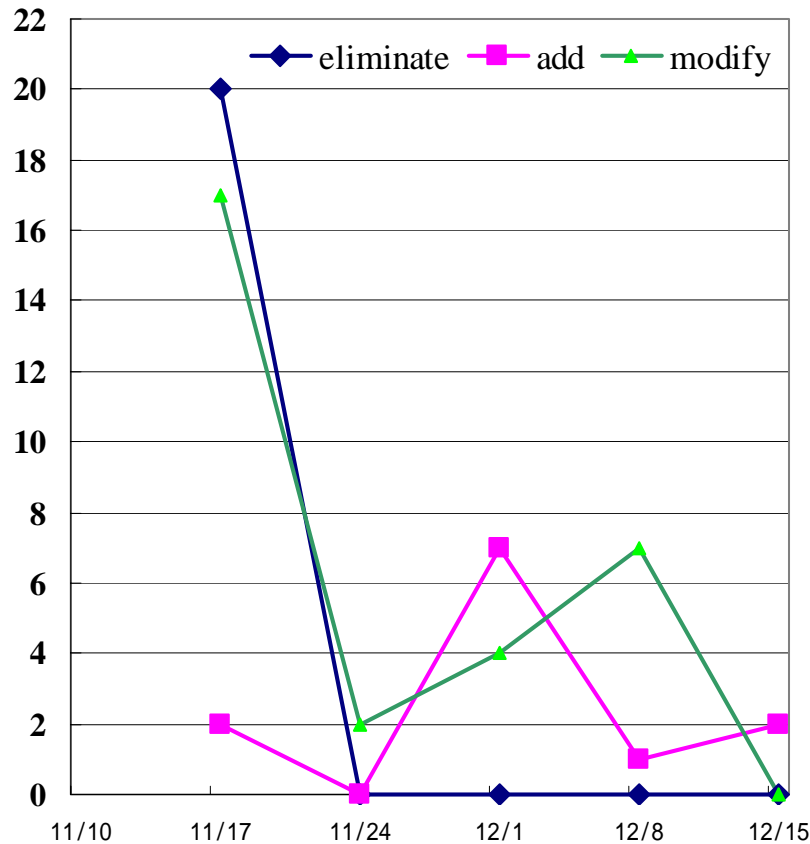


Fig.5 File Number Transition of Business B (ToBe)

AsIs phase was smoothly progressed to stable and ToBe phase was rather rapidly progressed. 12



6 weeks

Fig.6 Diagram Modification
in one file Example (8 sheets)

show that this area's AsIs description work is gradually stabilizing

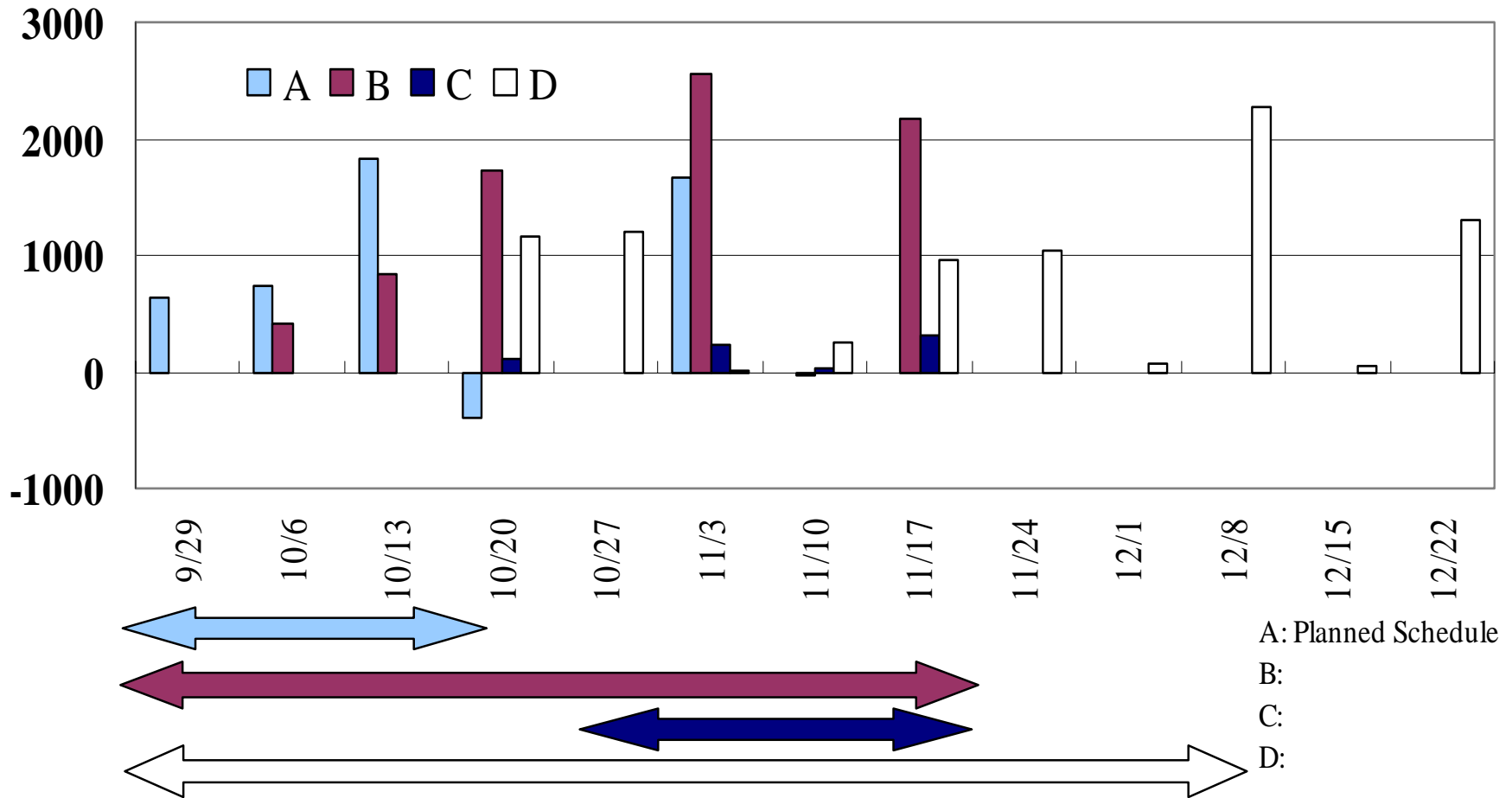


Fig. 7 Weekly Addition of Diagram Elements (AsIs)

the description process for the four businesses were executed shifted a few weeks gaps between the declared schedule and the real work progress based on actual product information are clearly visible.

24 weeks

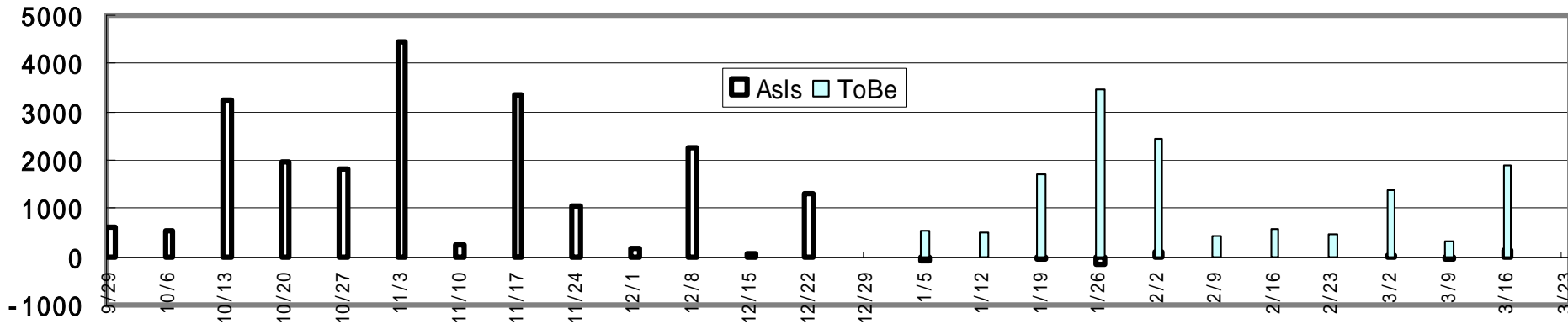


Fig.8 Total Weekly Addition of Diagram Elements (AsIs and ToBe)

The amount of work performed can be cleared from that figure.

Evaluation and Study of the Measurement Results Comparison with official progress report

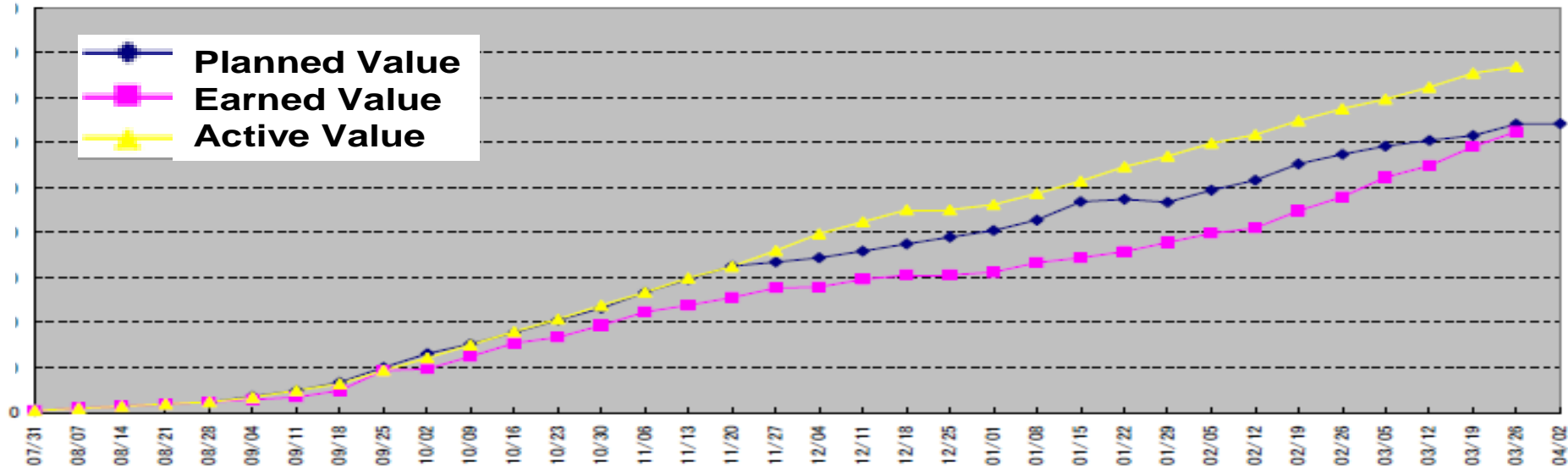


Fig9. EVM Report

Declaration level.

Only consulting company side data.

The consumed human resources, but it is not clear about the situation of the outcome amounts.

during a long period progress was delayed but when the deadline was coming it progressed rapidly and finished on time. 16

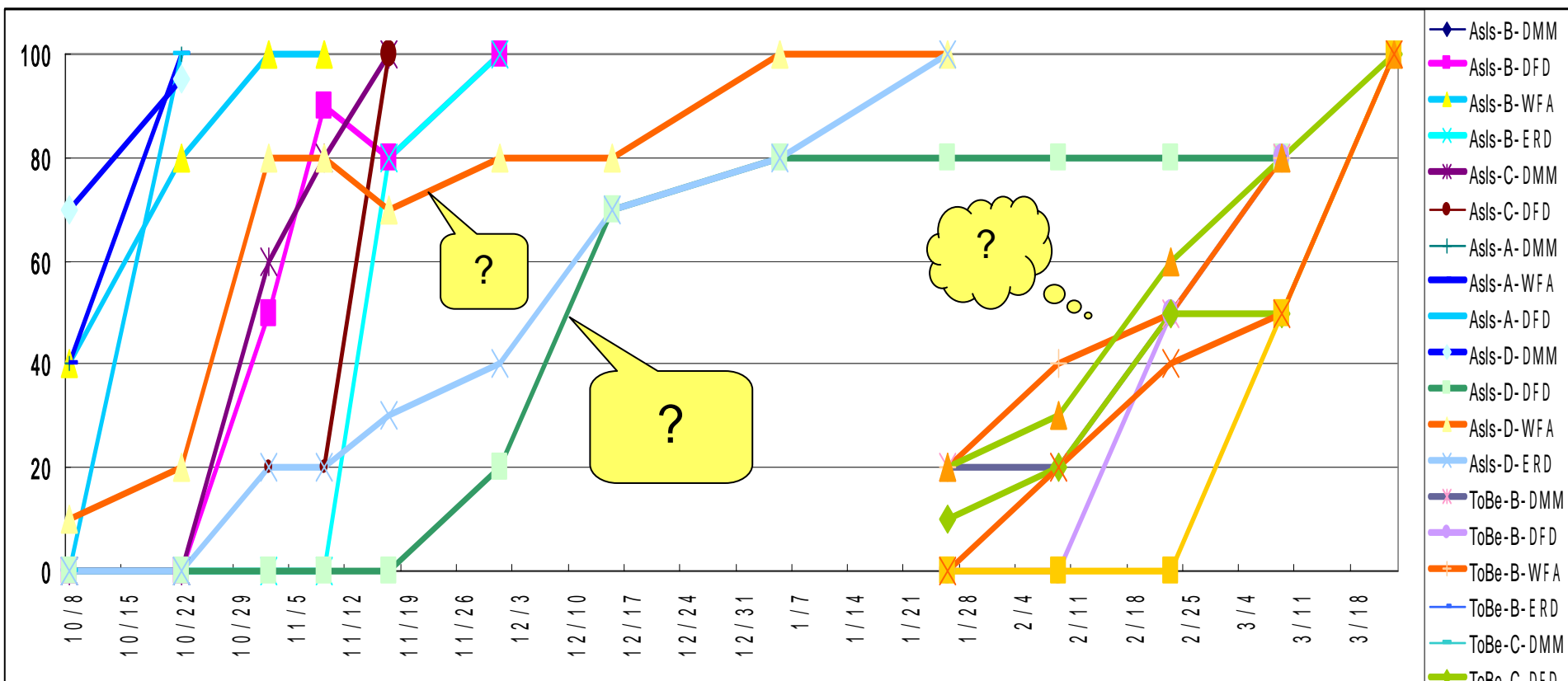


Fig. 10 Declaration Level Progress Report (AsIs & ToBe) (%)

From WBS report

granularity is very rough.

There is no information about the amount of outcome produced.

based on declared progress estimation criteria.

be limited by self declaration and human intervention.

Study for new software metrics possibility

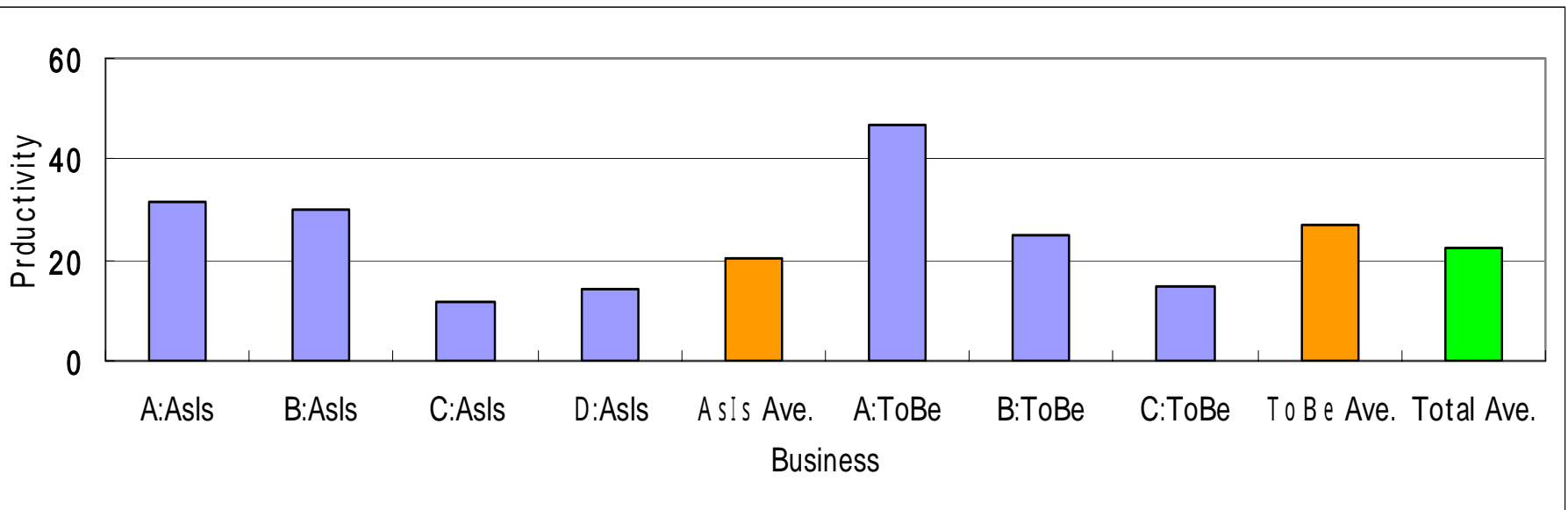


Fig. 11 Diagram Elements per effort

For example, productivity depends on each business.

A and C had fewer products but their productivity shows different trends.

A, it was easy to understand business process, so it showed high productivity but C, the business process was highly complicated, so low productivity.

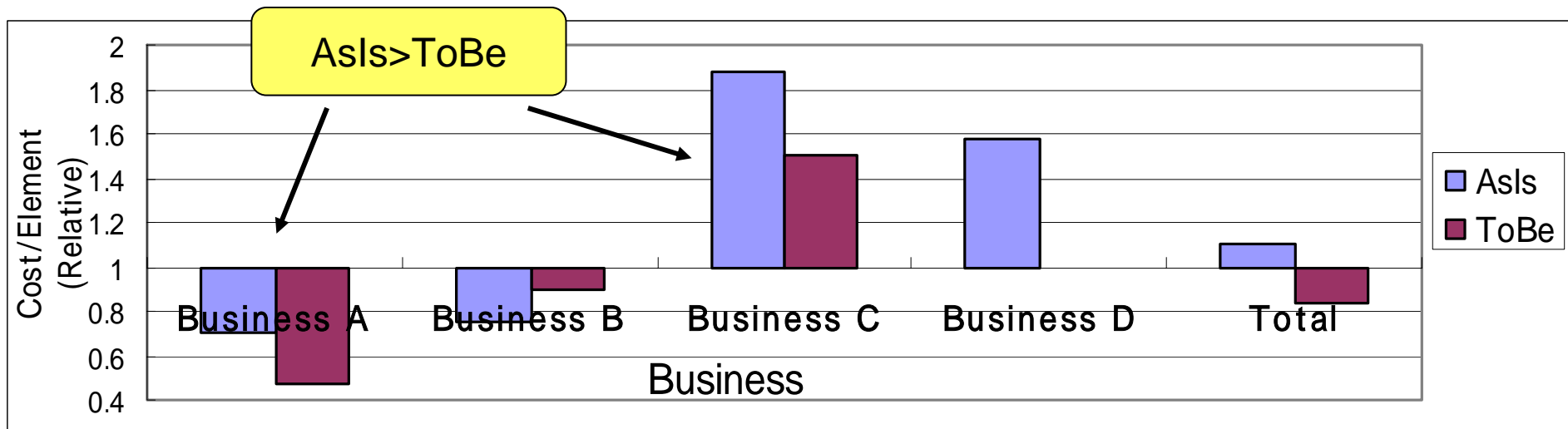
This trend is not same as the general trend in the development phase measured by SLOC and Function Point (FP).

In the development phase, generally larger development has lower productivity.

Possibility as a software benchmark data element

From the viewpoint of software metrics

the number of diagram elements in the requirements definition phase of the EA method process is strongly analogous to SLOC



1=average

Fig.12 Cost per Diagram Element (relative value)

IWSM-Mensura2007

International Workshop on Software Measurement

International Conference on Software Process and Product Measurement

- 開催場所・日程:パルマ デ マロルカ(スペイン)、11月5日- 8日
(会場:バレアレス諸島大学)
 - 論文発表、1セッションの司会、会議と2つのWorkshopに参加。
- 欧州のソフトウェア計測に関する研究グループを中心に昨年開設された国際会議。ワークショップIWSM と合体。IWSMのほうは第16回。
- 3日間で30件の論文発表、17カ国からの参加。
- 発表の約半分はPhDコースの学生によるもの。
 - 印象:国際社会で生きてゆく研究者、指導者の実績集積の場。
- 次回開催は、ミュンヘン。

IWSM-Mensura 2007

International Conference on Software Process and Product Measurement

眼に留まった研究 (研究の枠組み型)

- Best Paper Award
 - ドイツUlm大学のダイムラークライスラーとの産学連携プロジェクトの評価に関する発表。
 - 10年間、20個の実験プロジェクトの成果の報告。
Experiences on Using Software Experiments in the Validation of Industrial Research Questions
- IESEから
 - 社会科学者
 - An Infrastructure for Empirically-based Software Engineering Technology Selection

基調講演

ドイツ、マグデブルグ大学 : Reiner Dumke 教授

- これまでのソフトウェア計測に関する沢山の書籍の分類紹介
- 今後書かれるべき課題の整理
- 教授の近著 (Software Measurement) の紹介
 - ソフトウェア計測の研究課題の全体を俯瞰するのに素晴らしい
- 計測のためのインフラストラクチャーとして、標準化、法やルール、原則などの枠組みづくりから、サービス提供、コミュニティづくり、先取り環境へという教授の持論が示された。
 - 今後の方向性に大変参考になった

<http://ivs.cs.uni-magdeburg.de/~dumke/>

<http://ivs.cs.uni-magdeburg.de/~dumke/V1DumkeMensura07.pdf>

3. Measurement and Publications

MEASUREMENT INFRASTRUCTURES

**Software
Measurement
Frameworks**

(Standards,
Laws, Rules,
Principles etc.)



**Measurement services,
Communities,
Proactive Infrastructures**



must be
written



参加したWorkshop

- Mike Berry :オーストラリア
 - Improving Measurement and Analysis through Assessment
- Aline Ablan教授:ケベック大学、モントリオール校
 - A Software Measurement Knowledge Area For the Guide to the Software Engineering Body of Knowledge SWEBOK
 - Ablan教授はSWEBOKのExecutive Editor
 - Chapter 12 Software Measurementを追記中。
 - 追記と新しいViewの提示

http://mensura2007.uib.es/documents/SwMeasBok_Ch12_vMay192007.pdf

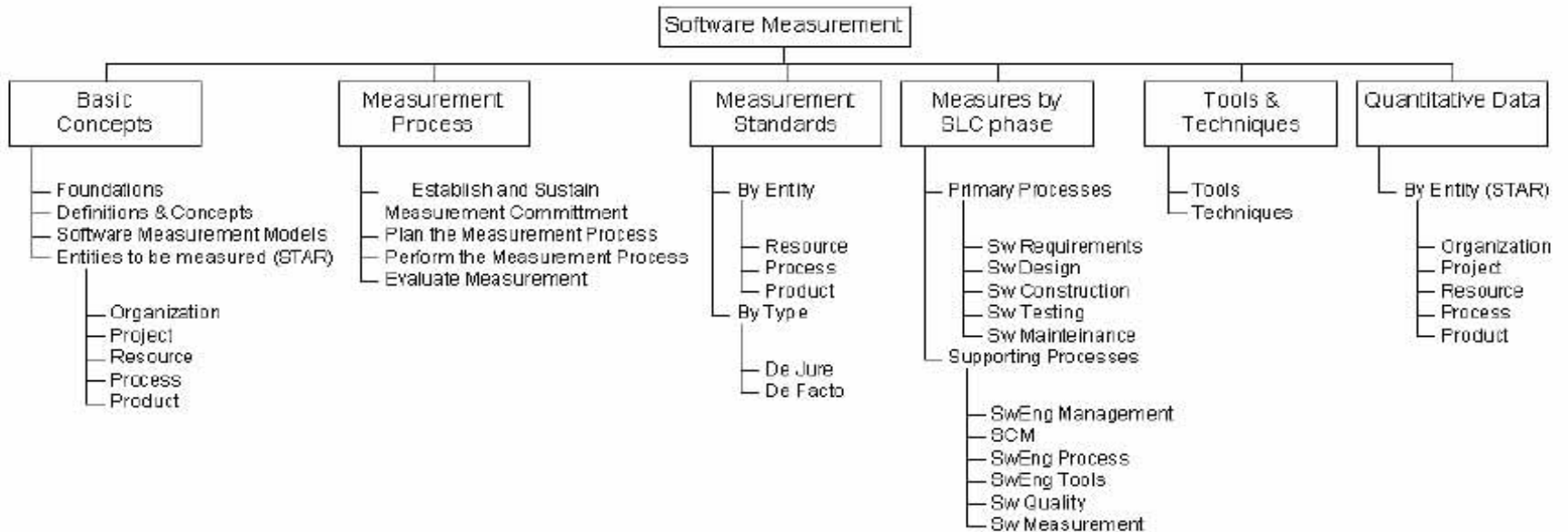


Figure 1. Breakdown of topics for the Software Measurement KA



所感：国際社会で、情報の多い有意義な体験となった。ちょっとした留学気分。
国際社会との乖離を痛感。