Title:

Empowering Non-technology SMEs in the Management of Technology in Manufacturing

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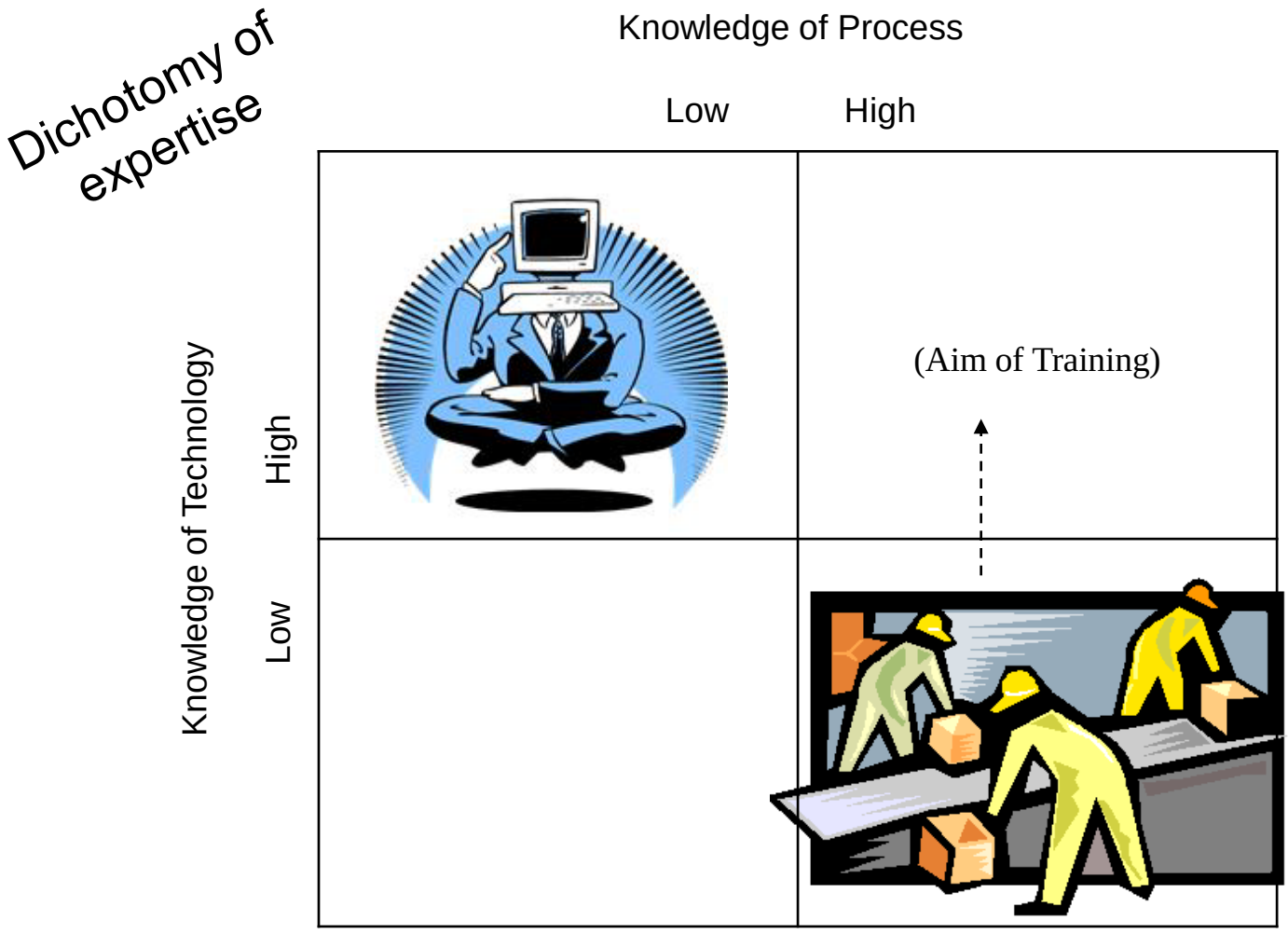
Agenda

- The case for SME empowerment
- Information use
- The study
- Results
- Conclusion

The case for SME empowerment

- ERP is focused on large organisations
- Technology management approaches
  - Business performance approach
  - National policy oriented
- Non-technology organisation looses control

Government Solution: IT Policy (Top-down approach)



ISBE 2011: Empowering non-technology SMEs by Okike, C and Fernandes, K

Information use

- Definition
- Properties
  - Resource (has a structure)
  - Specification (ontology)
- Strategic
  - Impacts production outcome
- Can be applied in technology management

Definition

Leonard-Barton and Deschamps (1998) define information use as the application of acquired and transmitted information in the decision making of an organization at strategic and tactical levels.

Emphasis is placed on understanding the information and the contextual environment where it is applied to ensure that it is fit for purpose.

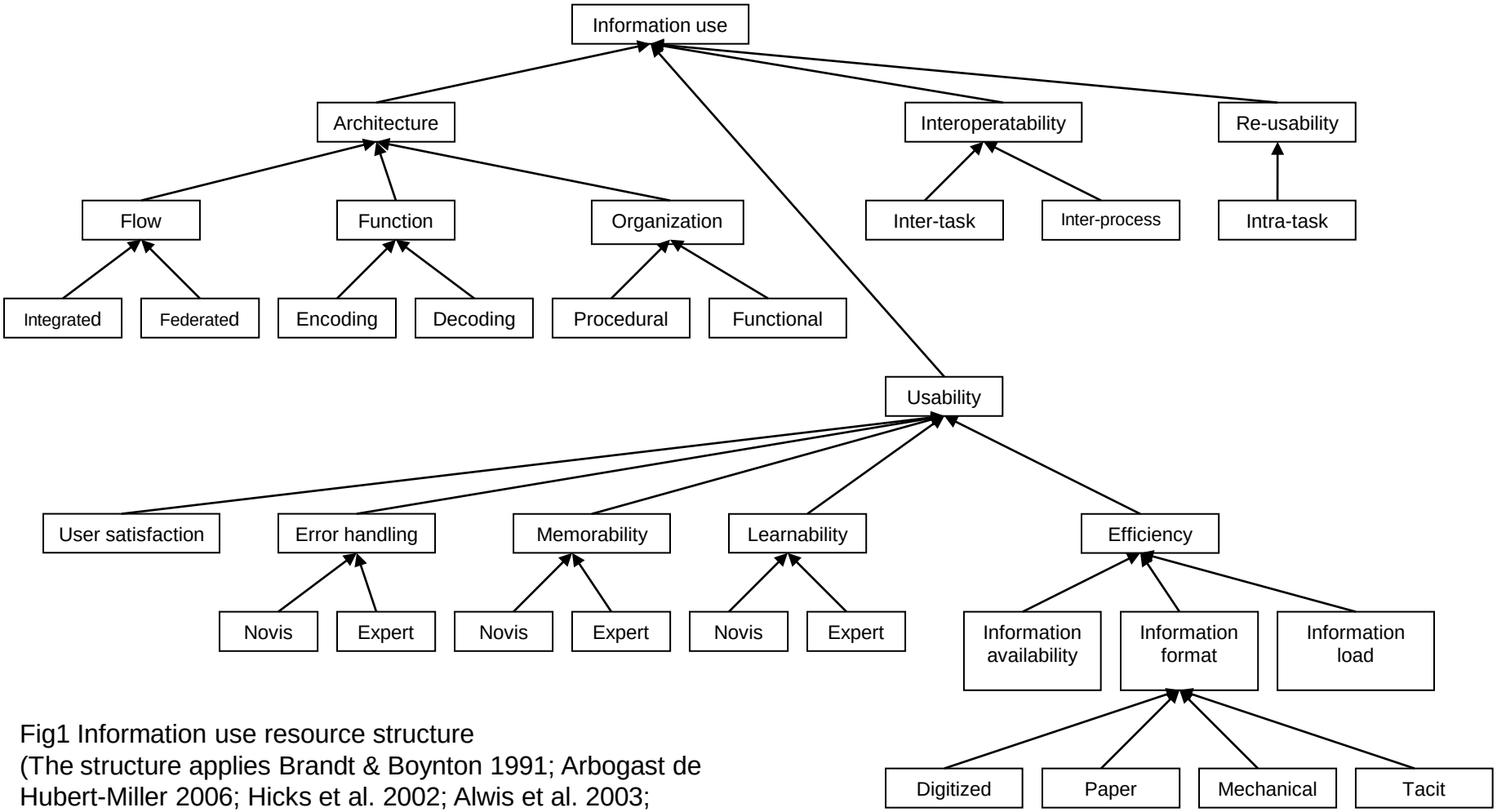
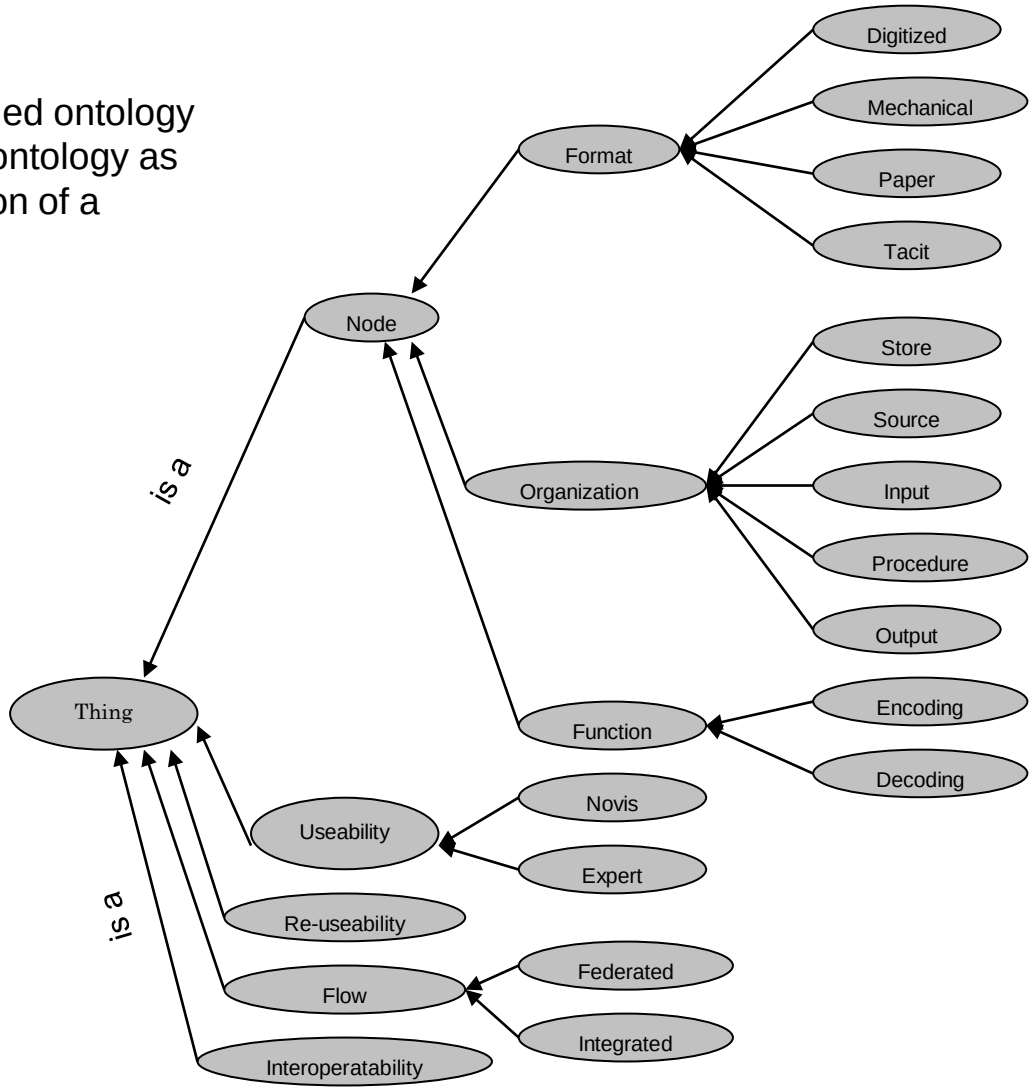


Fig1 Information use resource structure
(The structure applies Brandt & Boynton 1991; Arbogast de Hubert-Miller 2006; Hicks et al. 2002; Alwis et al. 2003; Memmi 2004; ISO 9241; Scholtz 2004; Zhang et al 1998).

Fig 2 Ontology of Information Use (Format adapted from Lanzenberger et al. 2008).

Gruber (1995) accorded ontology a gestalt by defining ontology as an explicit specification of a conceptualisation.



reality | abilities and potentials | knowledge base, tools | operations

The study

- Ethnographic study involving 4 cases
- Data collection methods:
  - interview, observation, documentation
- Data analysis: case comparative method
  - thematic analysis
  - Pattern matching and explanation building
- Validity and reliability issues
  - constructs and concepts corroborate the standard vocabulary
  - theories are reconstructions of reality rather than a deduction based on causality
  - correctness of the data is confirmed by the interviewee
  - Subjectivity in data gathering is minimized through triangulation

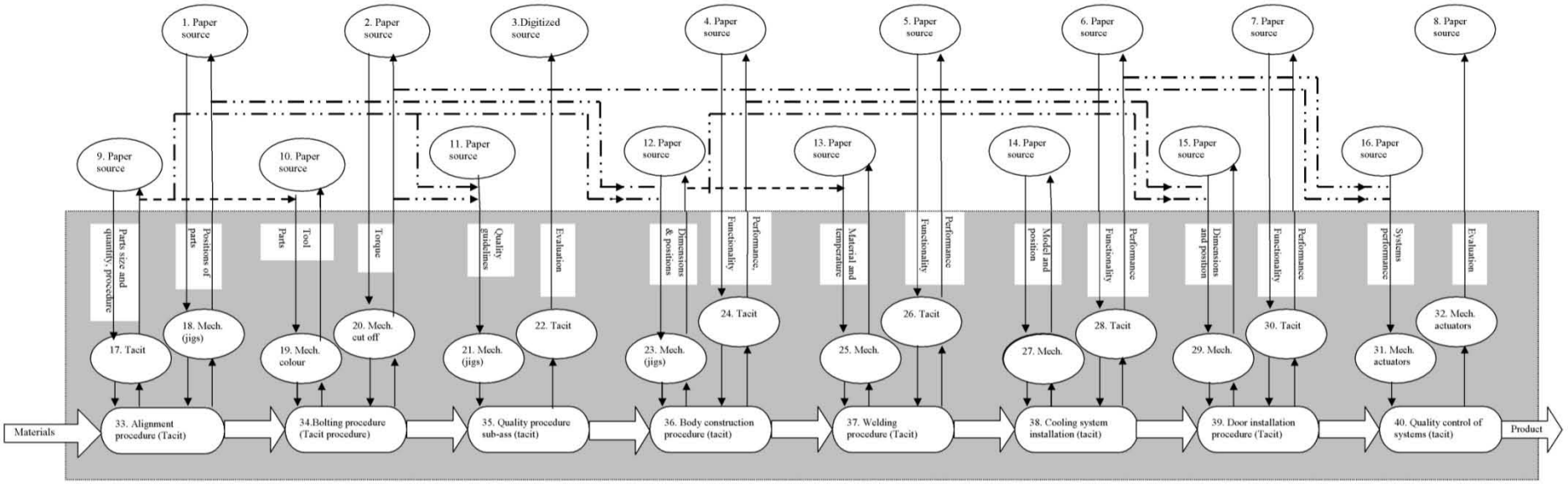


Fig 1 Case A information use interoperatability

Legend

- Node
- Process
- Material flow
- Information use value flow (Information use Architecture)
- Information use interoperatability on the shop floor via job card
- Information use interoperatability on the shop floor via external link

Table 1 Case A Information Usability

Task	Information	Learnability (cognition through experience)	Memorability (remembering through imagery, organization, elaboration)	Errors (error possibility due to existence of many sources of the information)	Load (proportional number of coding)	Re-usability	User satisfaction
Alignment	Parts and procedure	Novis/high (few parts, simple instructions)	Novis/high	2 (drawing, job card)	high	high	
	Position of parts	Expert/low (inadequate coordinates)	Expert/high	2 (drawing, jig)			75%
Bolting	Tool	Novis/high	Novis/high	none	high	high	75%
	Torque	Novis/low	Novis/high	none			
Quality (sub-sys)	Quality guide	Expert/low	Expert/low	none	high	low	75%
	Evaluation	Expert/high	Expert/high	none			
Body Building	Dimensions and positions	Novis/high	Novis/high	none	high	high	
	Functionality and Performance	Expert/low	Expert/high	none			75%
Welding	Material and temperature	Novis/low	Novis/low	none	high	high	
	Functionality and Performance	Expert/low (weld test missing)	Expert/high	none			75%
Cooling system	Model and position	Novis/high (marked position)	Novis/high	2 (drawing, foundation)	high	high	
	Functionality and Performance	Expert/low	Expert/low	none			75%
Door	Dimensions and positions	Novis/high	Novis/high	2 (drawing, foundation)	high	high	
	Functionality and Performance	Expert/high	Expert/high	none			75%
Quality (systems)	Systems performance guide	Expert/low	Expert/low	none	high	high	75%
	Evaluation	Expert/low	Expert/low	none			

Fig 4 Information usability map for Case A (Assembly plant)

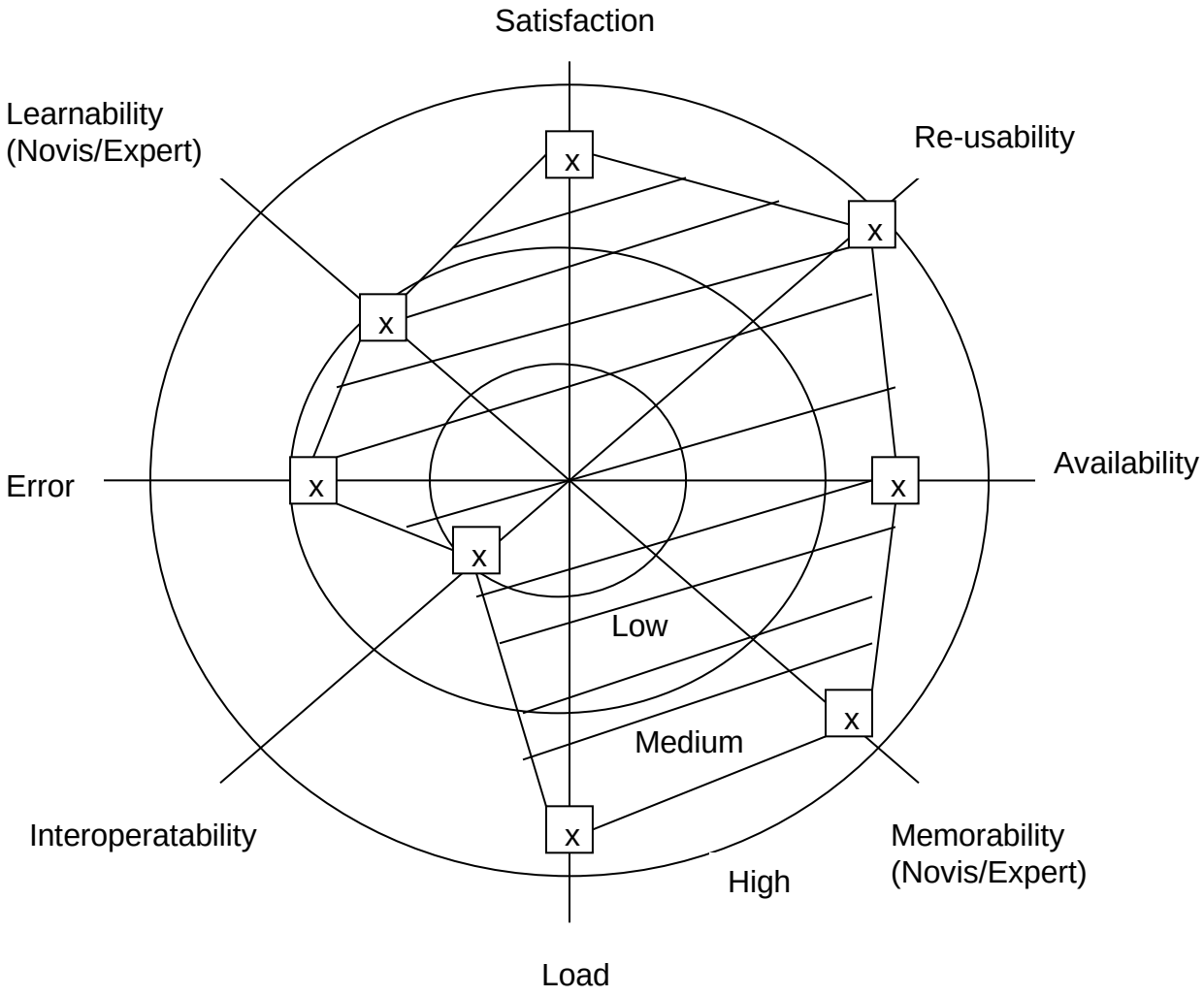


Fig 4 Information usability map for Case B (Crafters stamp manufacturer)

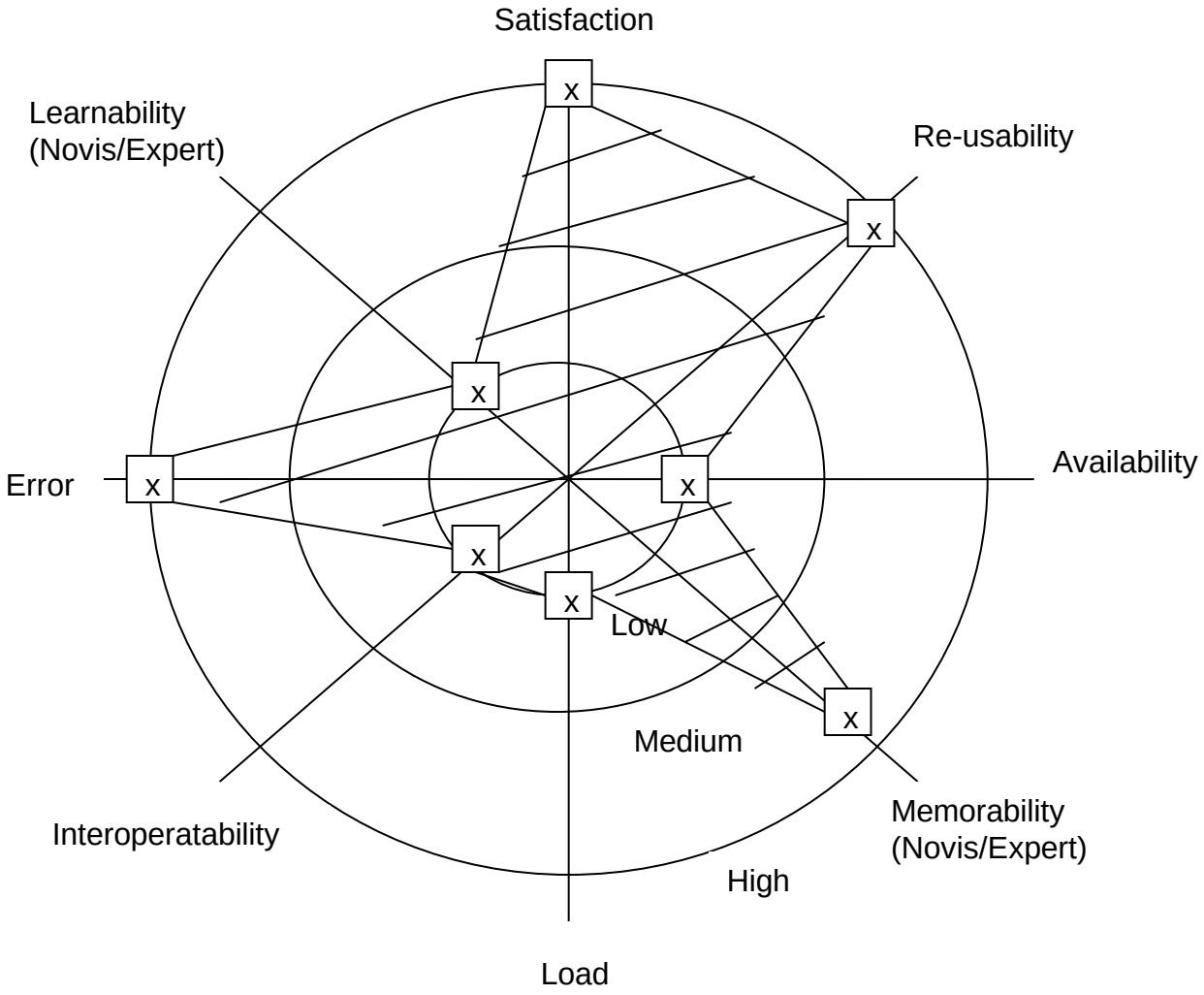


Fig 4 Information usability map for Case C (Concrete products manufacturer)

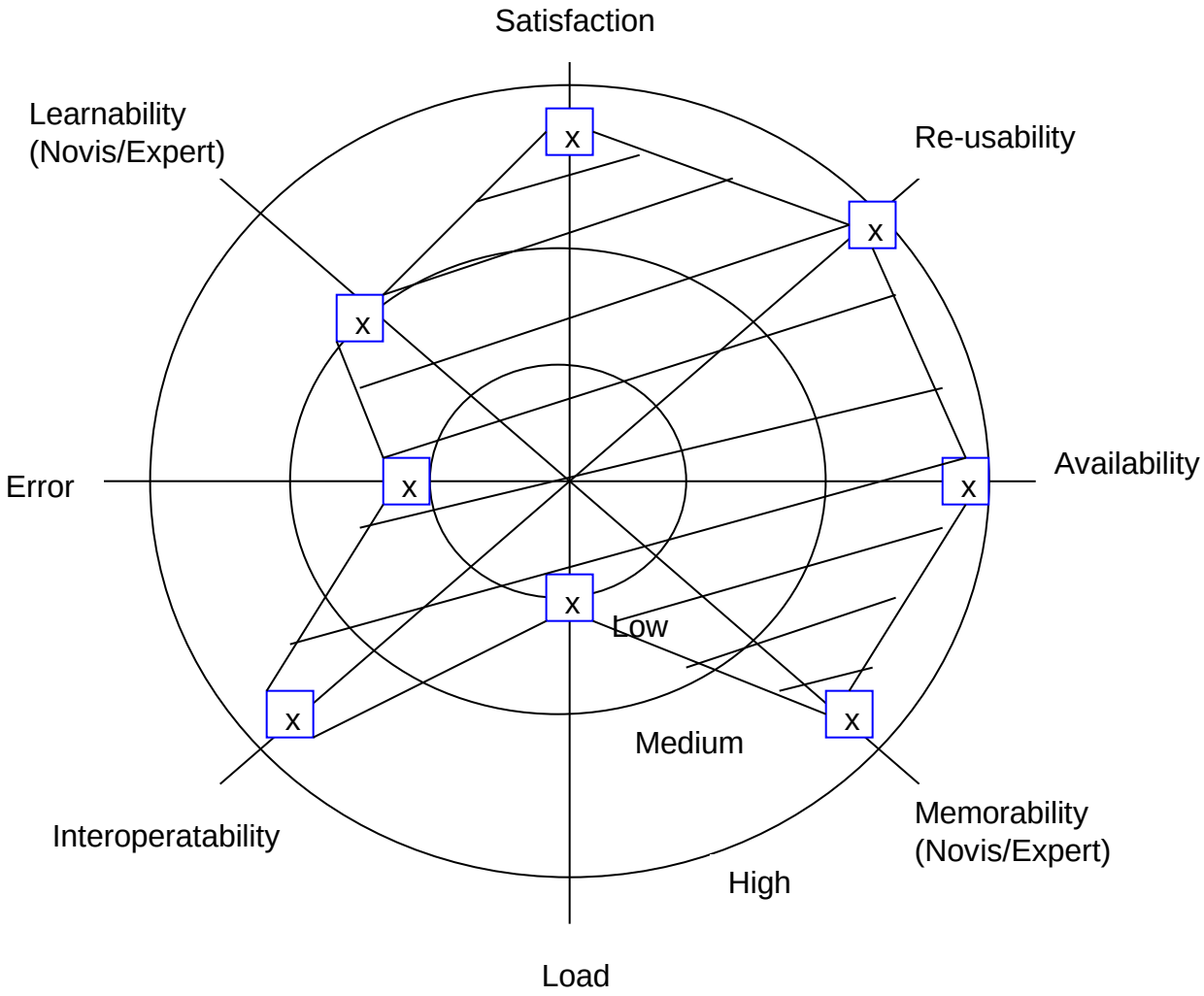
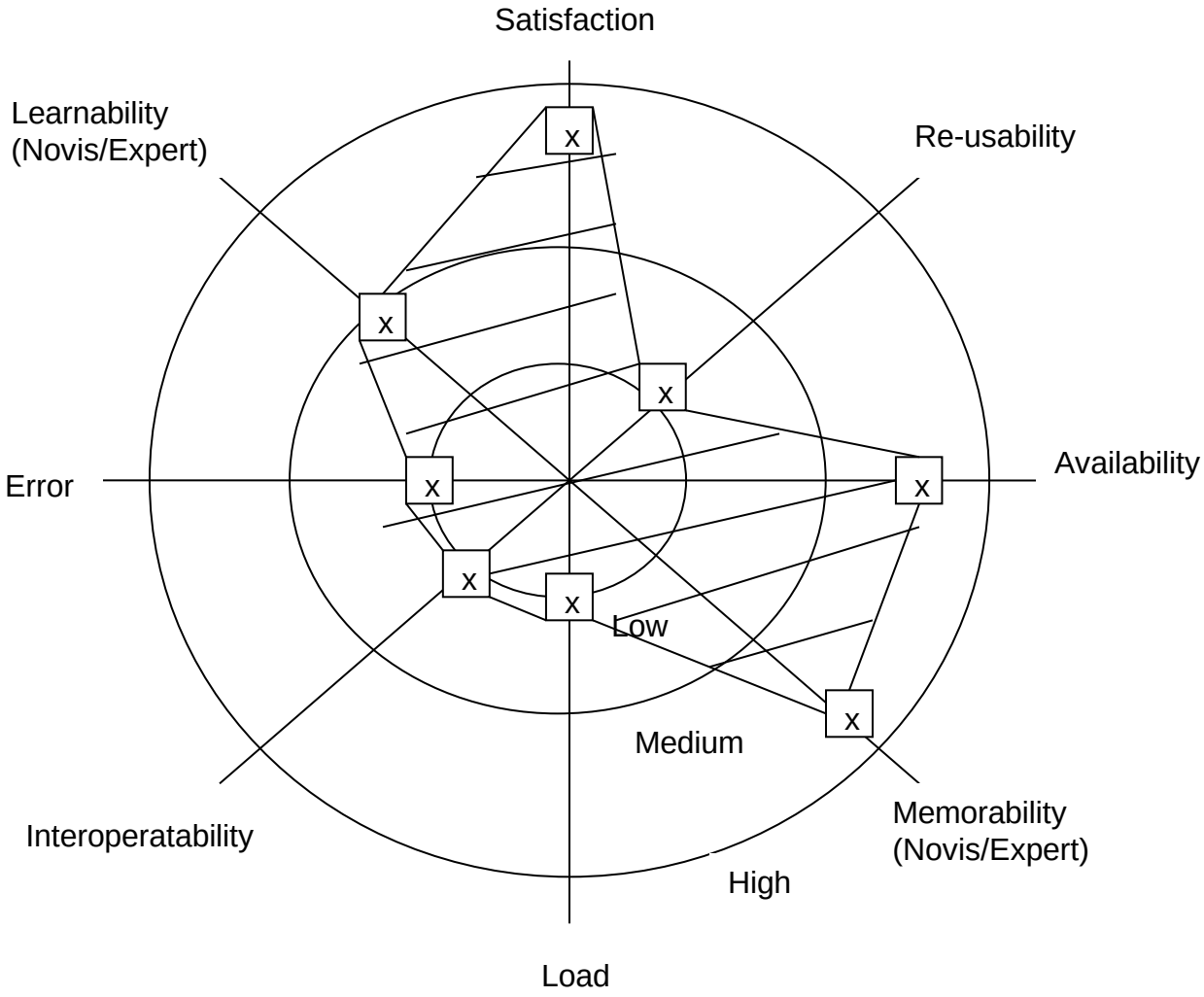


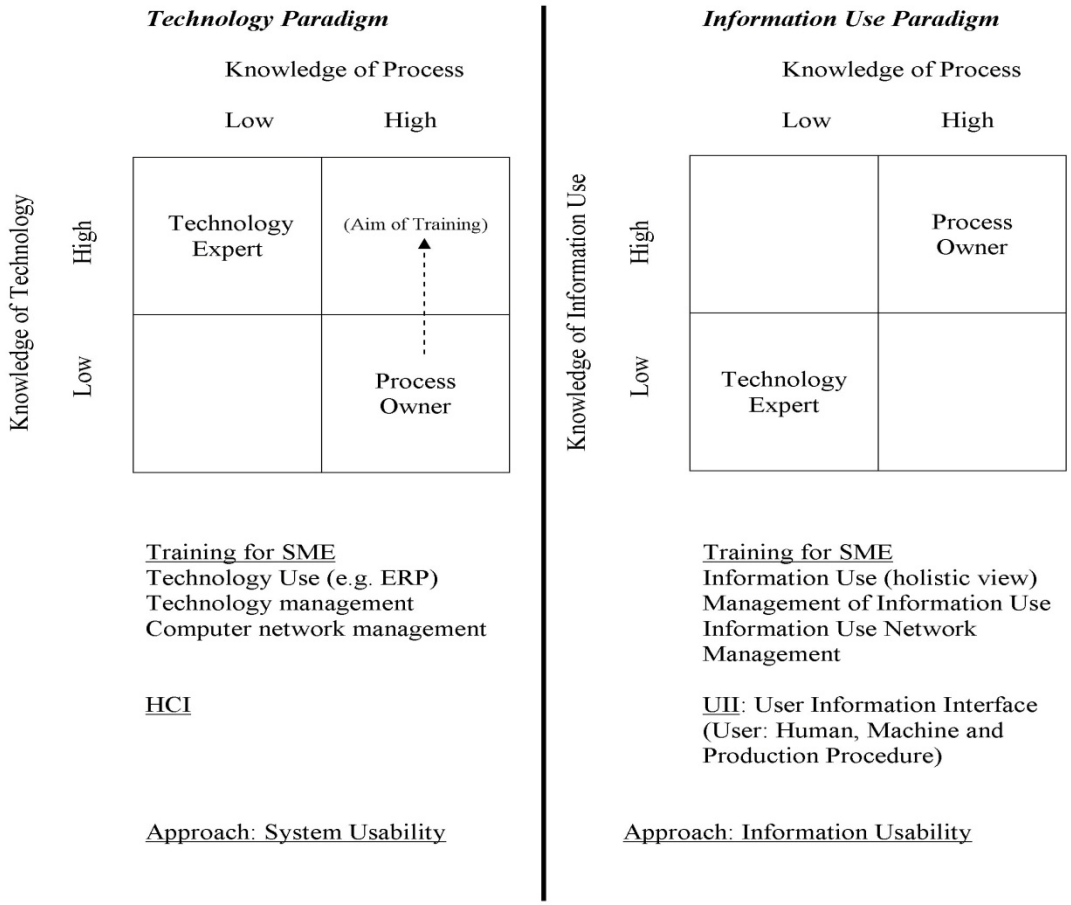
Fig 4 Information usability map for Case D (Medical devices manufacturer)



Recommended: IU policy
(Bottom-up approach)

Knowledge of Process

Knowledge of Information use	Low	High
High		
Low		


Technology Paradigm
Knowledge of Process
Low
High
Knowledge of Technology
High
Low
Technology Expert
(Aim of Training)
Process Owner
Training for SME
Technology Use (e.g. ERP)
Technology management
Computer network management
HCI
Approach: System Usability
Information Use Paradigm
Knowledge of Process
Low
High
Knowledge of Information Use
High
Low
Process Owner
Technology Expert
Training for SME
Information Use (holistic view)
Management of Information Use
Information Use Network Management
UII: User Information Interface (User: Human, Machine and Production Procedure)
Approach: Information Usability

Questions