What a Tangled Web Effort Estimation we Weave! How can Knowledge Management disentangle this Web?

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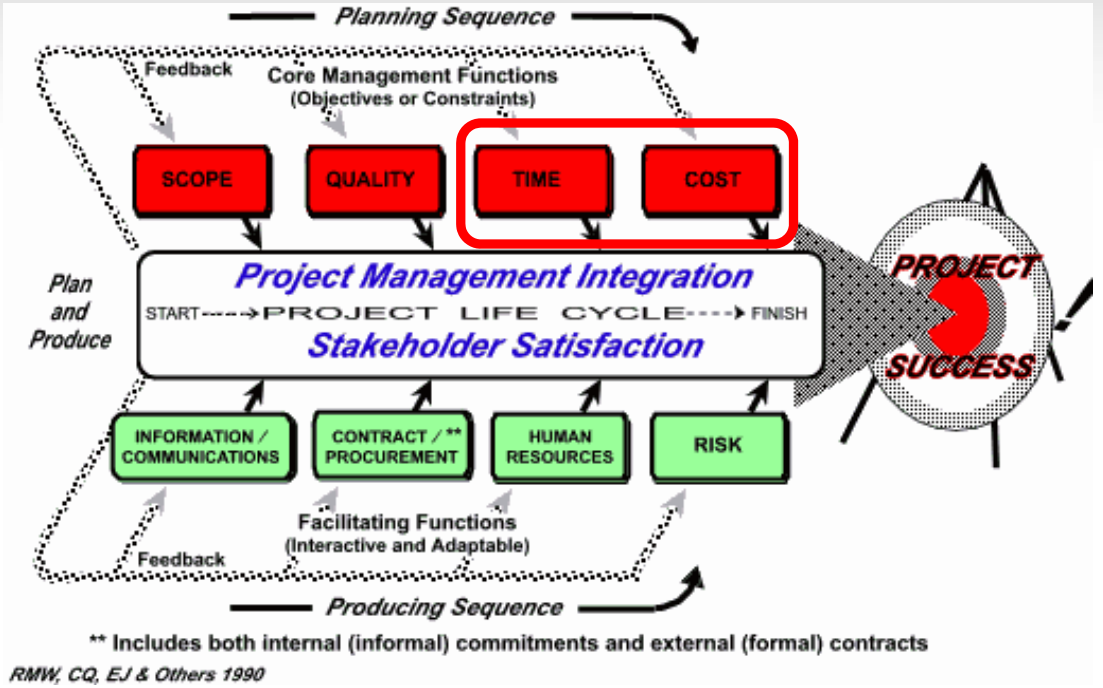
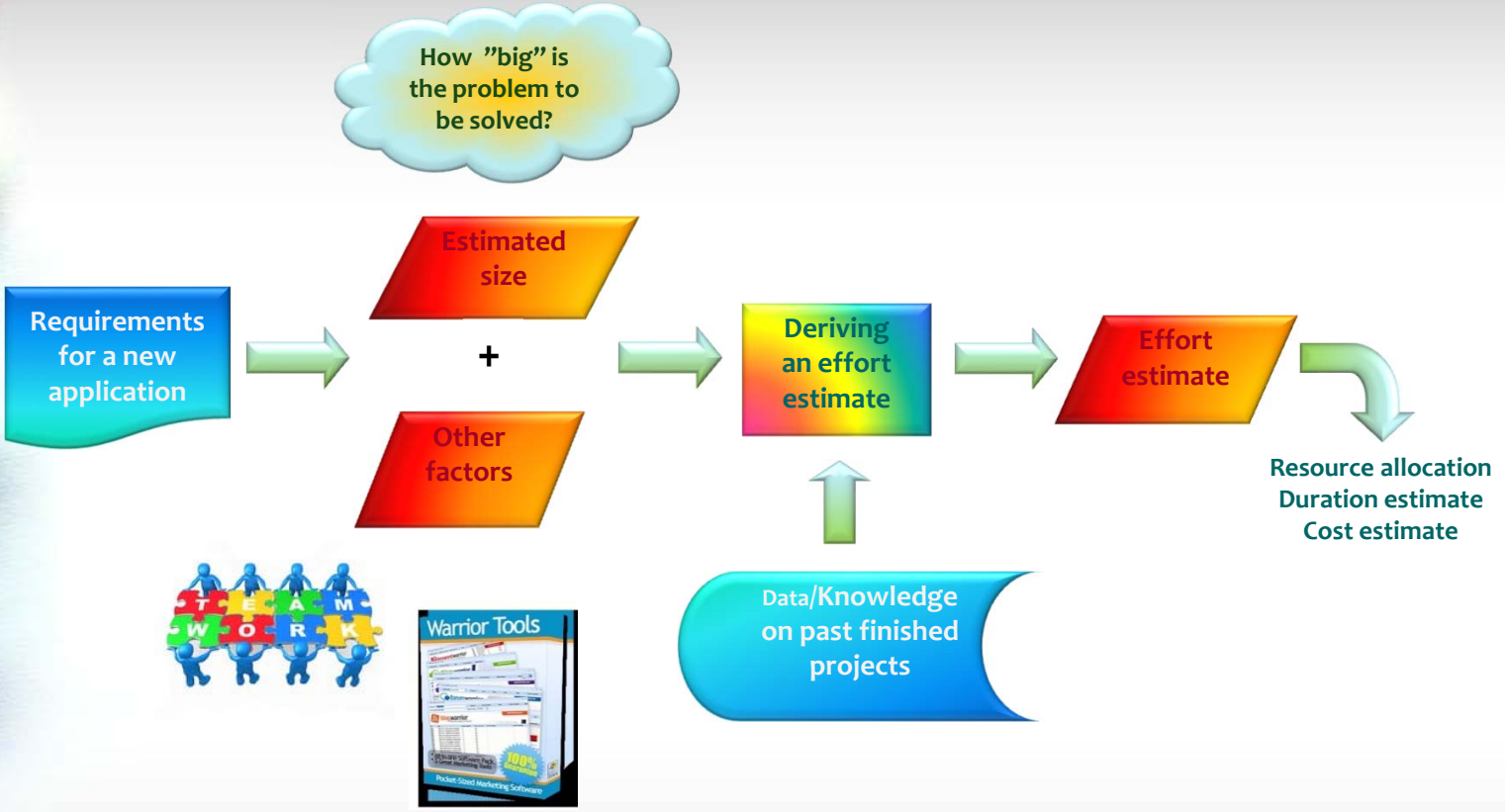
Software Project Management...



Project Management Institute's Project Management Body of Knowledge (PMBoK)

Let's look at a typical software effort estimation process...

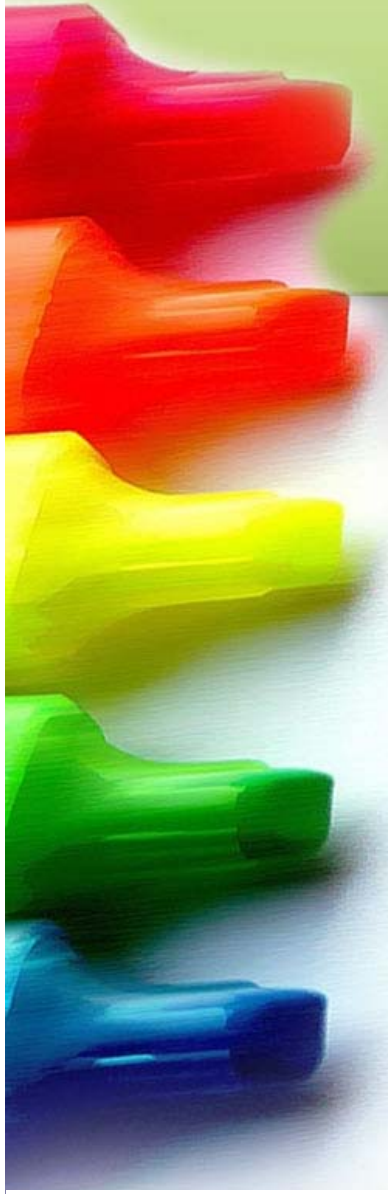


Mendes et al. (2005) Web Effort estimation, Web Engineering, Mendes and Mosley (Eds.), Springer-Verlag, pp. 29-73.

Data… Data… Data…

I cannot make bricks without clay![1]

[1] **William Shakespeare**



Why so many faulty bricks?... or… Why do projects fail so often?

- Among the most common factors[1]:

Software Effort Estimation error
can be of 30%-40% on average,
thus leading to
serious project management problems

users

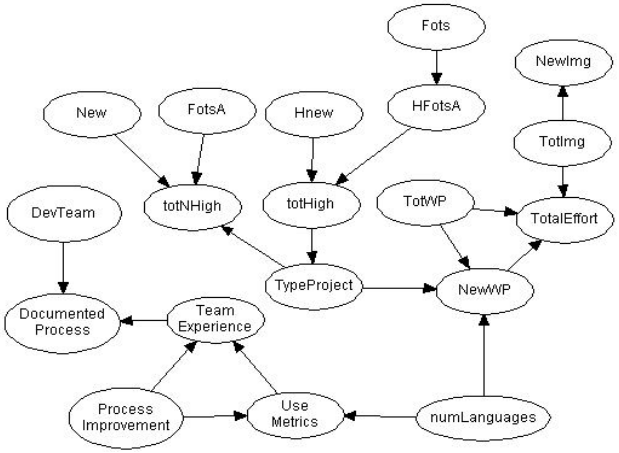
(Jørgensen and Grimstad, 2009)

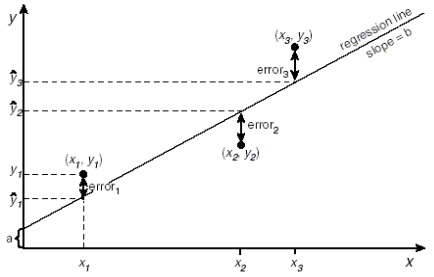
  - Poor project management
  - Stakeholder politics
  - Commercial pressures

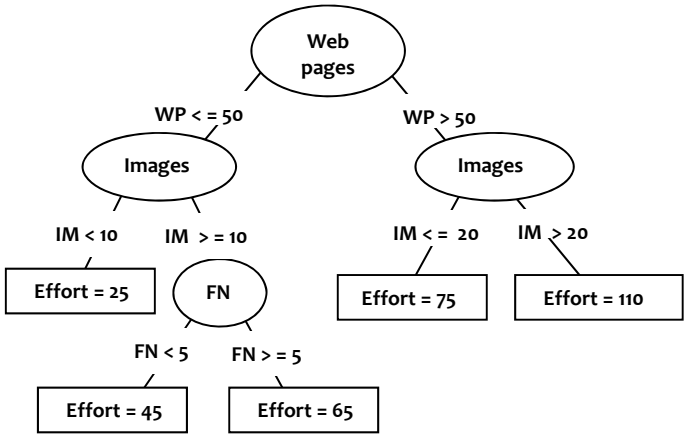
[1] Jørgensen, M. & Grimstad, S. (2009). Software Development Effort Estimation: Demystifying and Improving Expert Estimation, In: *Simula Research Laboratory - by thinking constantly about it*, ed. by Aslak Tveito, Are Magnus Bruaset, Olav Lysne. Springer, Heidelberg, chap. 26, pp. 381-404. (ISBN: 978-3642011559).

How has most research tackled this?

$$\hat{y} = a + bx$$







Mendes and Mosley (2008) Bayesian Network Models for Web Effort Prediction: a Comparative Study, IEEE Transactions on Software Engineering, Volume 34, Issue 6, Nov/Dec 2008, pp. 723-737,

Mendes et al. (2005) W

and what about the  ?

"Since the mid 1990s, Web development has been one of the fastest growing industries in the world"

http://en.wikipedia.org/wiki/Web_development

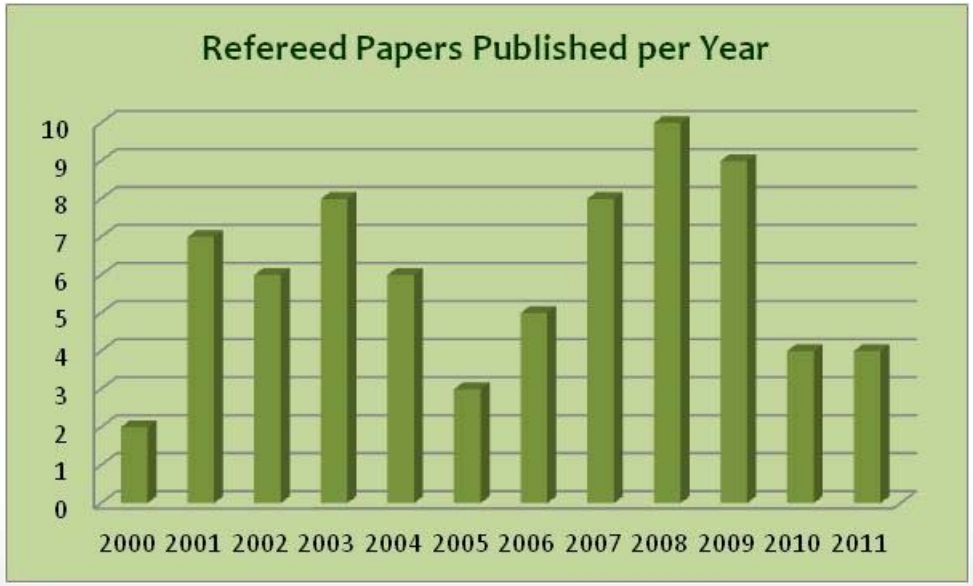
http://www.worldwidewebsize.com/

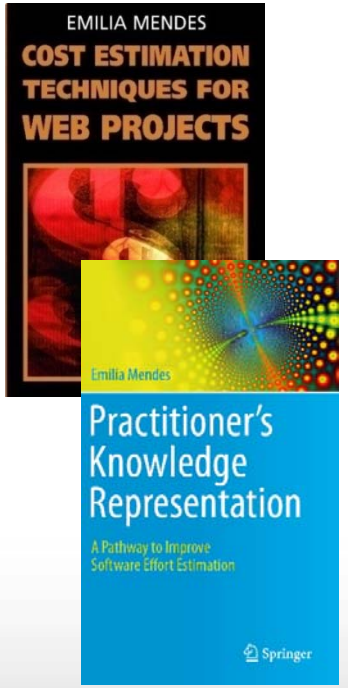
What about Web effort estimation?

It is a tangled (complicated) Web!

Let's elaborate…

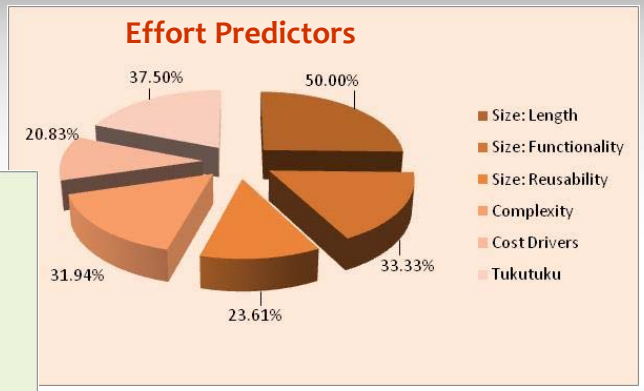
- State of the Art
  - First article in 2000 (Mendes & Counsel)
  - By 2012, 72 studies[1] & two books

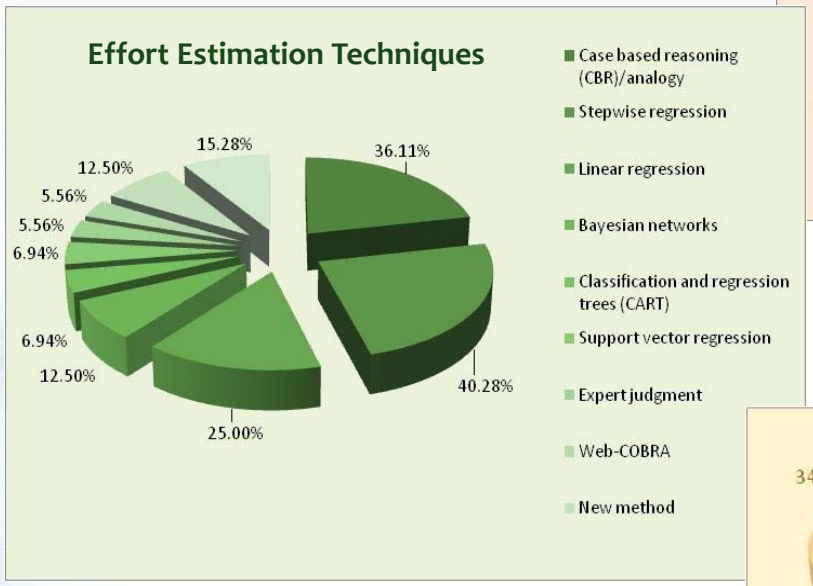


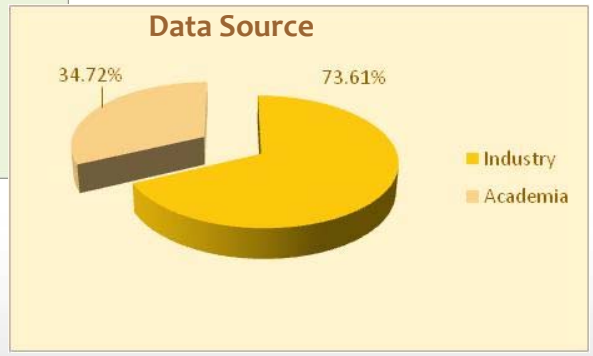


[1] Azhar, Mendes and Riddle (2012), A SLR of Web Resource Estimation, Proceedings PROMISE'2012

Main Findings…







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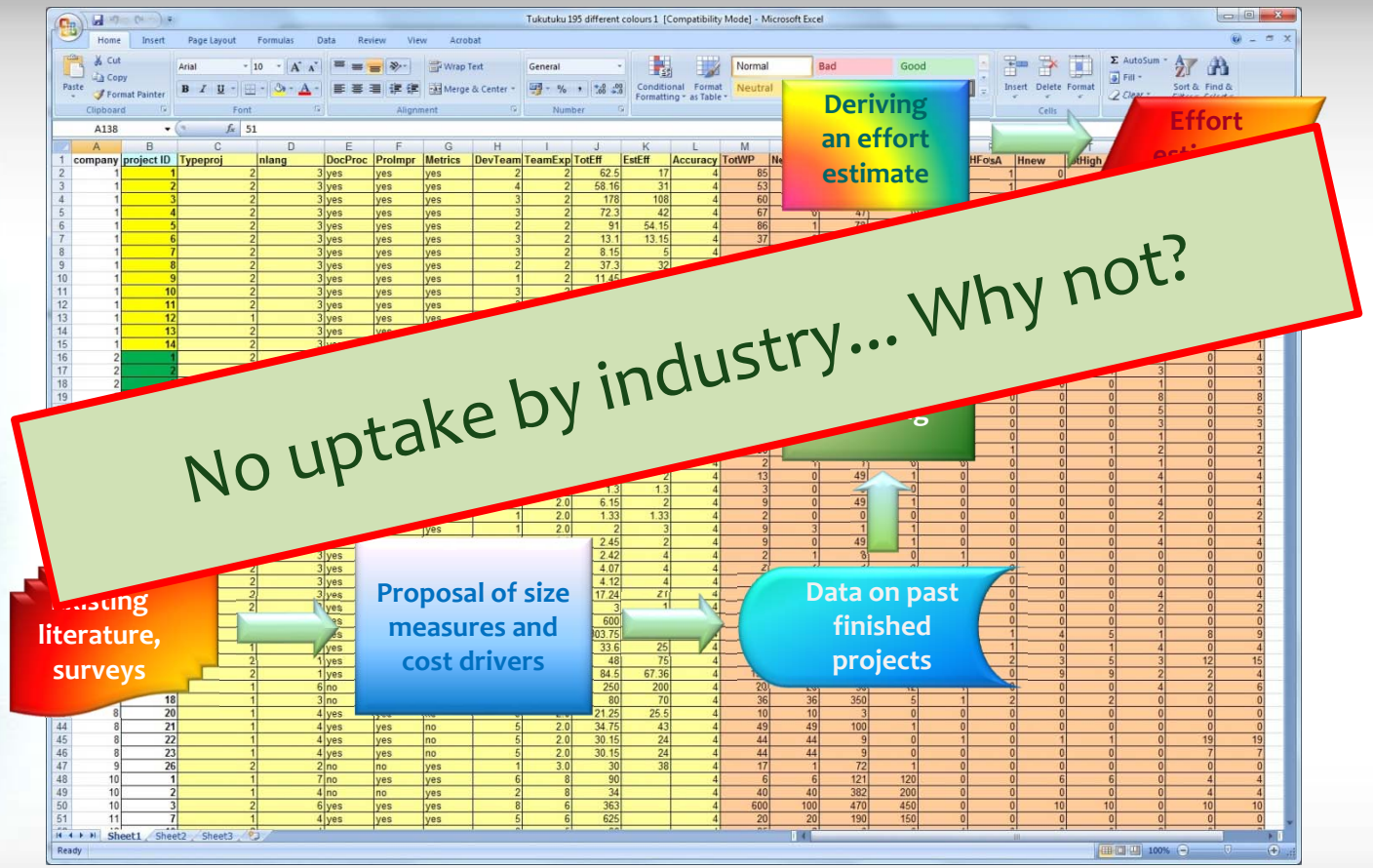
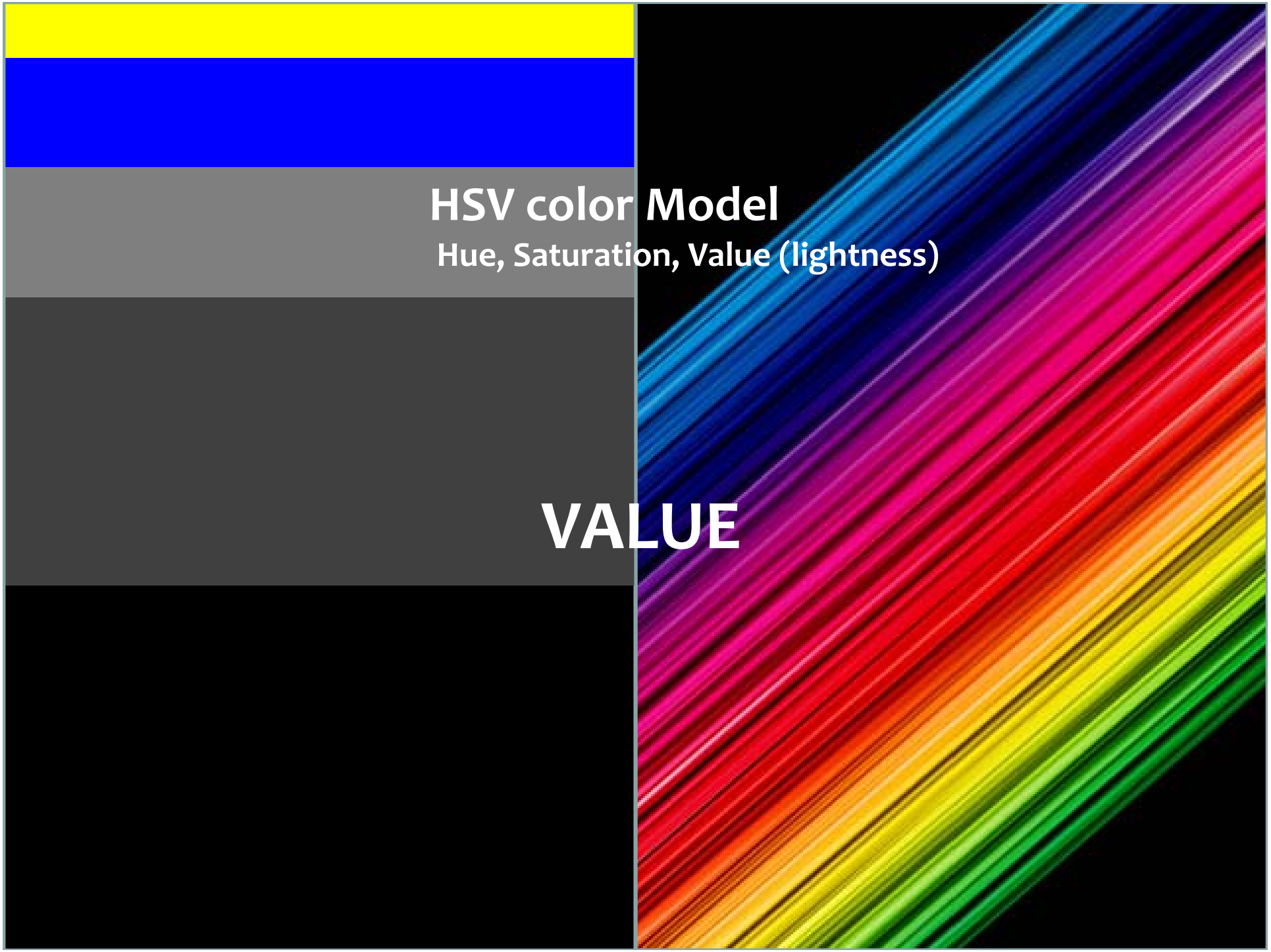
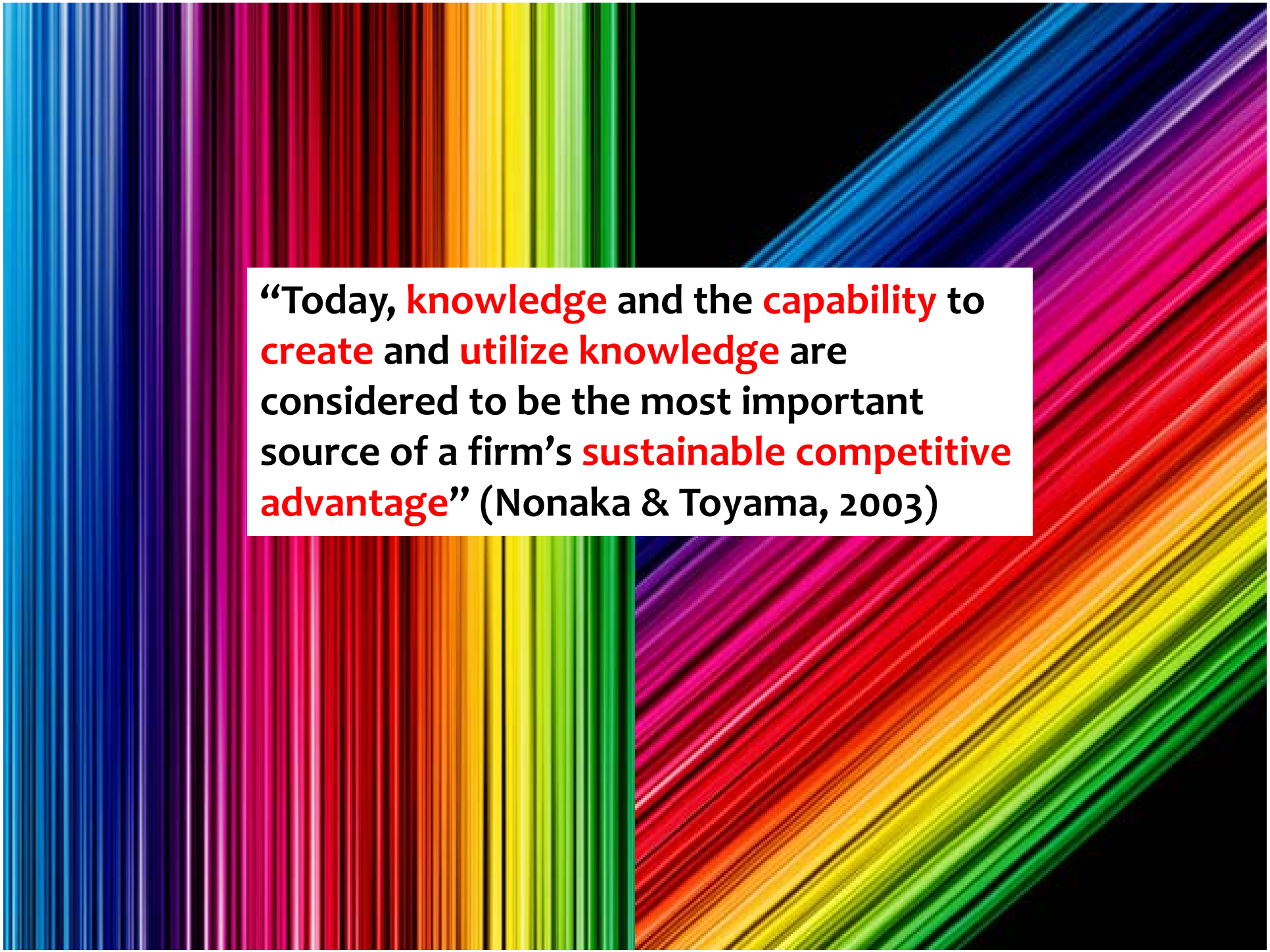
Pattern...

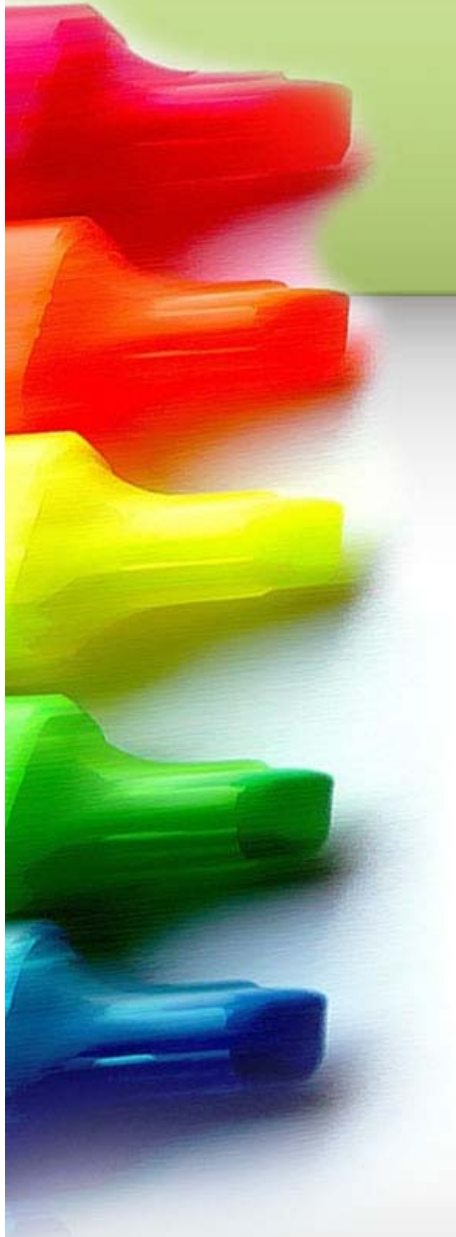


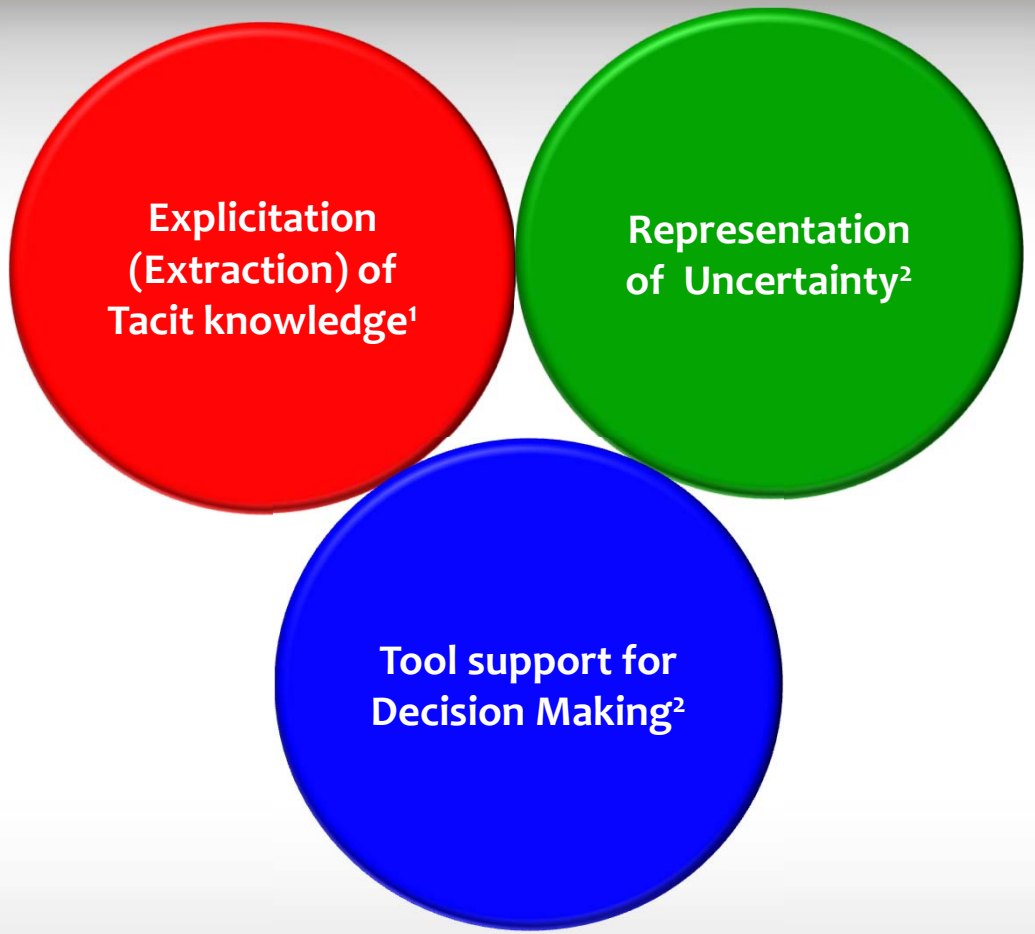
Mendes, E., Mosley, N., and Counsell, S. (2005) Investigating Web Size Metrics for Early Web Cost Estimation, Journal of Systems and Software, Volume 77, Issue 2, August 2005, pp. 157-172.


HSV color Model
Hue, Saturation, Value (lightness)
VALUE


"Today, knowledge and the capability to create and utilize knowledge are considered to be the most important source of a firm's sustainable competitive advantage" (Nonaka & Toyama, 2003)

Knowledge Management…



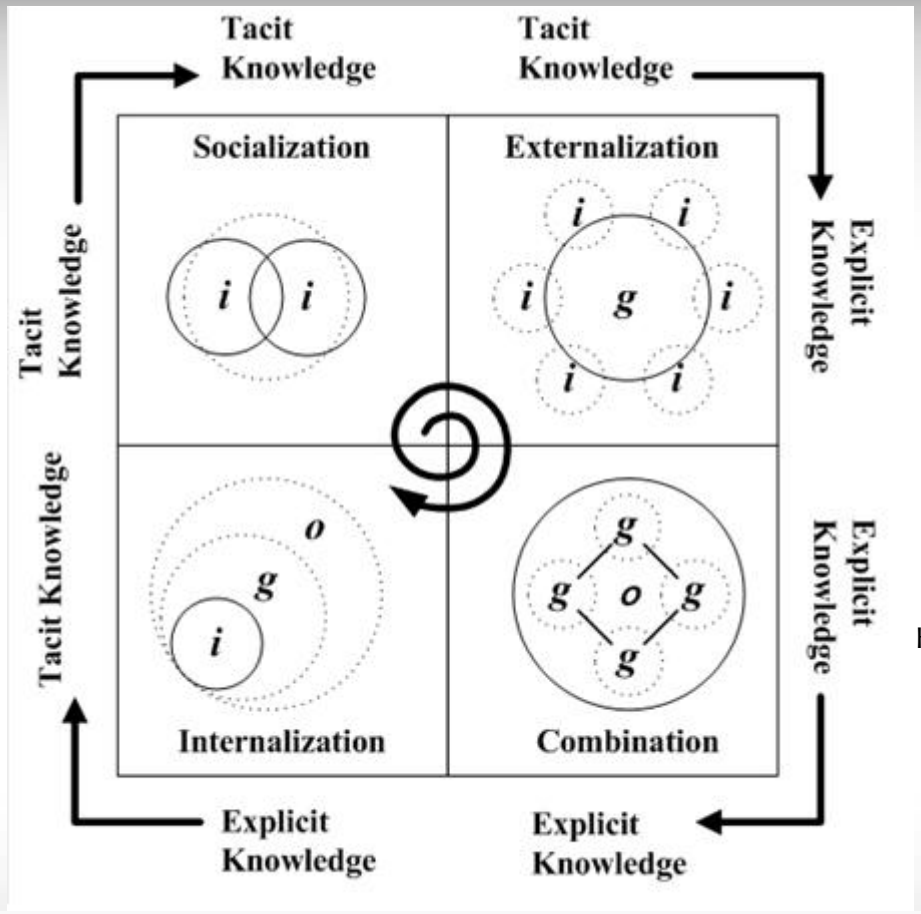


[1]Smith, M. K. (2003) 'Michael Polanyi and tacit knowledge', *the encyclopedia of informal education*, www.infed.org/thinkers/polanyi.htm

[2]Mendes, E., Polino, C., & Mosley, N. (2009), Building an Expert-based Web Effort Estimation Model using Bayesian Networks, Proceedings of the 13th International Conference on Evaluation & Assessment in Software Engineering.

Theory of Knowledge Creation…

A process of sharing experiences and hence creating Tacit knowledge



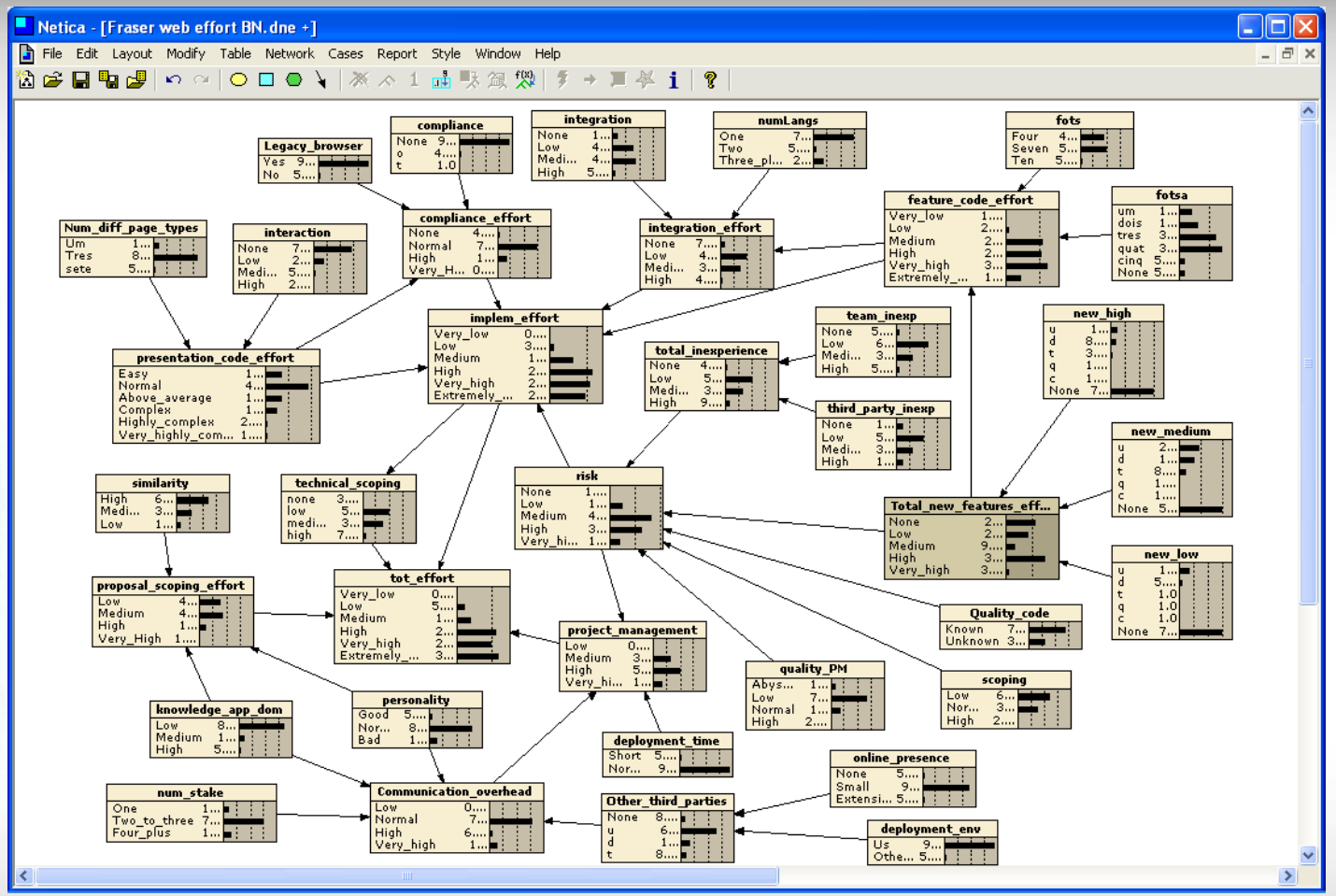
A process of Articulating Tacit knowledge Into Explicit concepts

A process of 'embodying' Explicit knowledge into Tacit knowledge

A process of Combining concepts into Knowledge System

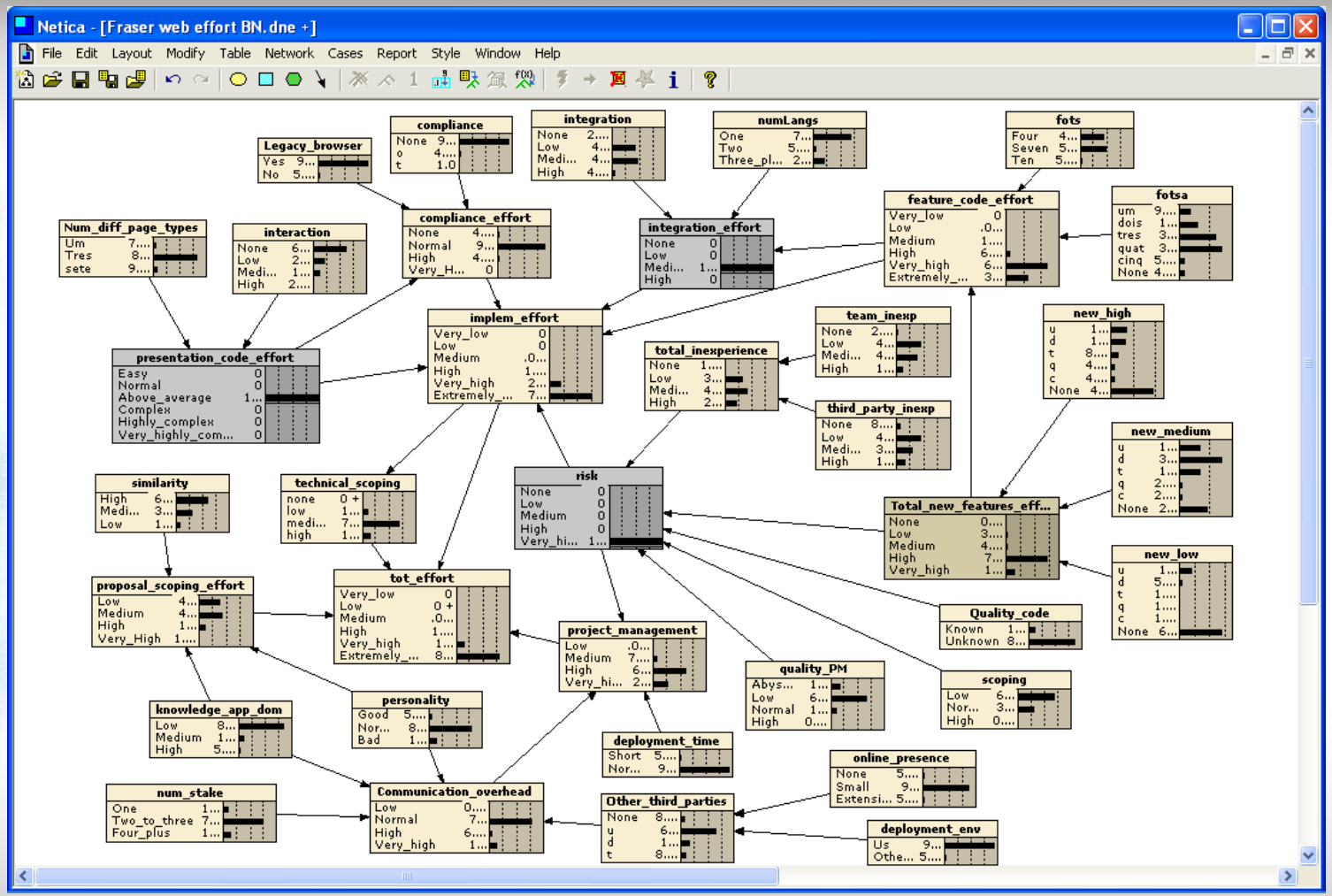
Nonaka, I., and Toyama, R. (2003). 'The knowledge-creating theory revisited: knowledge creation as a synthesizing process'. Knowledge Management Research & Practice, Vol 1, pp 2-10.

Evidence:
100% Expert-based Model



Mendes, E. (2012) Using Knowledge Elicitation to Improve Web Effort Estimation: Lessons from Six Industrial Case Studies, Proceedings of the International Conference on Software Engineering (ICSE), pp. 1112-1121 .

What-if Scenario…



Is it 'Quick to Market'?

	Companies (Country: New Zealand(NZ) or Brazil (BR))					
Characteristics	A (NZ)	B (NZ)	C (NZ)	D (NZ)	E (NZ)	F (BR)
Number of DEs	1	1	2	2	7/2	1
Number of Employees	~5	~5	~20	~30	~100	~30
Number of 3-hours elicitation sessions	12	6	8	12	12/12	20
Total hours to elicit & validate model	36	18	24	36	98	60
Effort to elicit & validate model (person/hours)	72	36	72	108	324	120
Number of factors	14	13	34	33	38	19
Number of relationships	18	12	41	60	50	37
Number of past projects used as validation set	22	8	11	22	22	9

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Value = Improved:

Thank you