A Comparison Between KANBAN CONWIP and Hybrid Control Policies in JIT Manufacturing

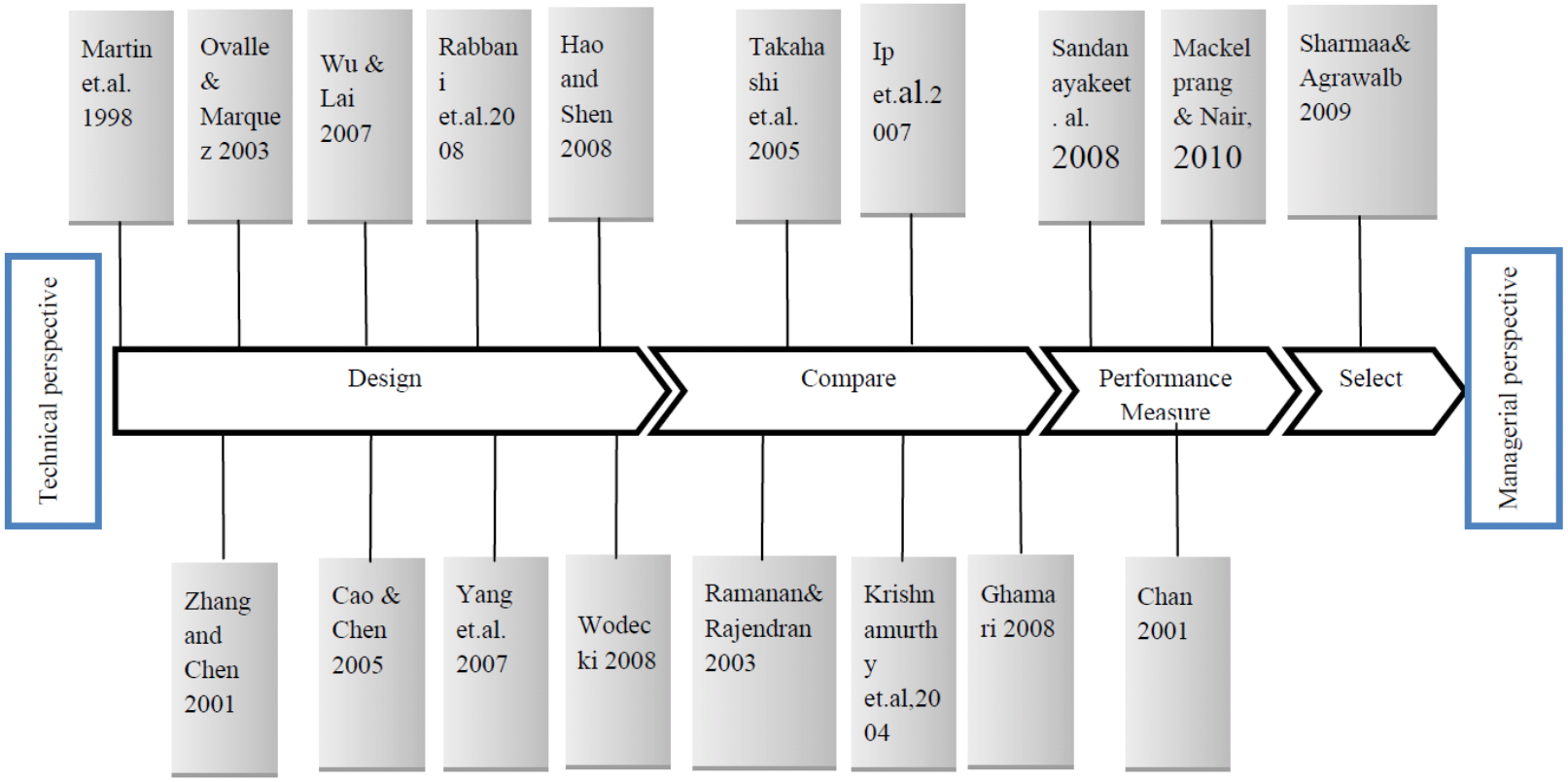
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Comparison Between KANBAN CONWIP and Hybrid Control Policies in JIT Manufacturing

- Just In Time (JIT) is a strategy that fulfills the creation of flow and cutting of wastes steadily (Ohno,1988)
- Two major production control policies to achieve JIT: Kanban and CONWIP
- Researchers compare Kanban, CONWIP and hybrid models
- Motivations: Reducing WIP and performance of production system

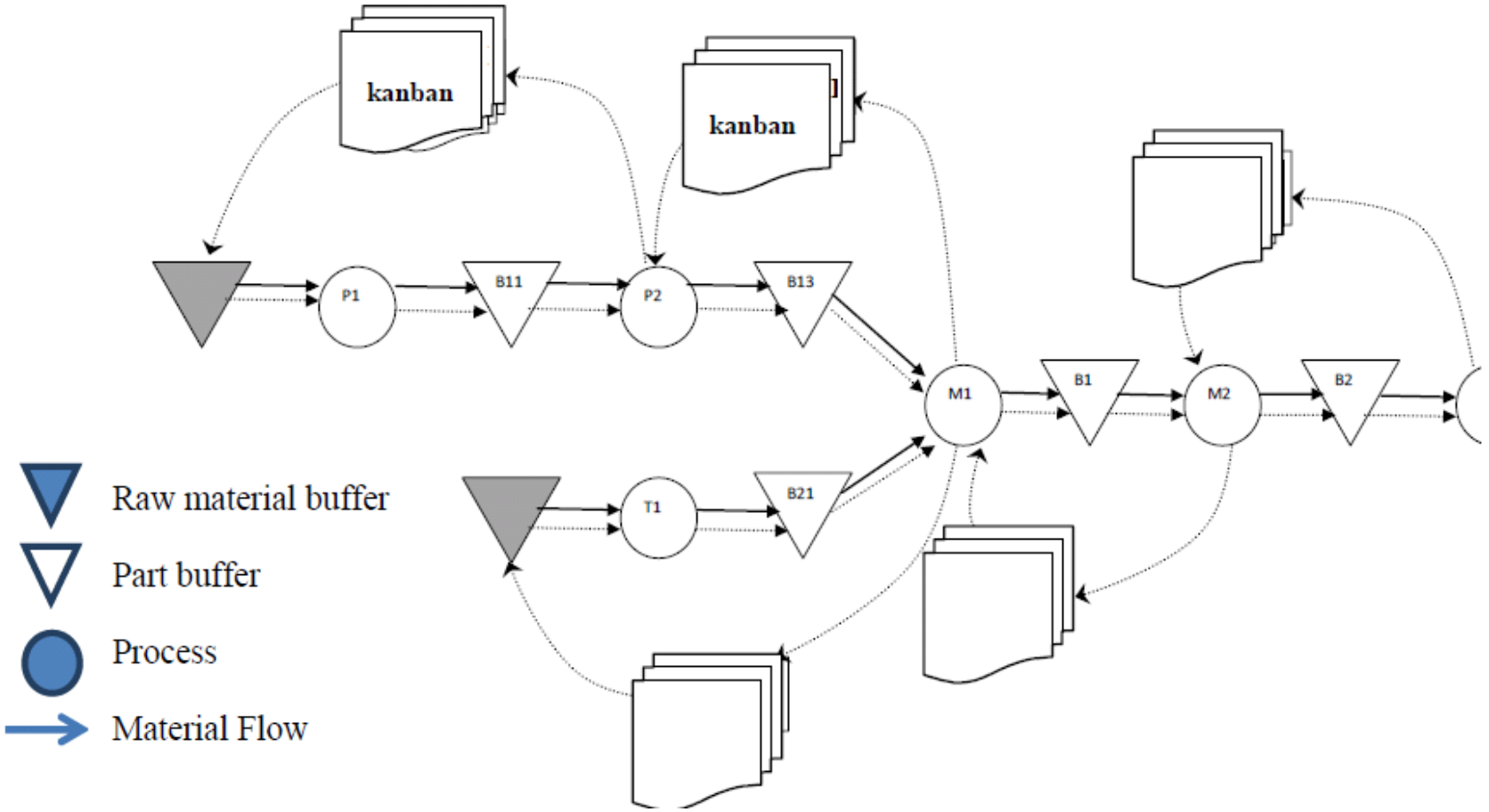
Literature


Technical perspective
Martin et.al. 1998
Ovalle & Marquez 2003
Wu & Lai 2007
Rabbani et.al.2008
Hao and Shen 2008
Takahashi et.al. 2005
Ip et.al.2007
Sandanayakeet. al. 2008
Mackelprang & Nair, 2010
Sharmaa& Agrawalb 2009
Design
Compare
Performance Measure
Select
Managerial perspective
Zhang and Chen 2001
Cao & Chen 2005
Yang et.al. 2007
Wodecki 2008
Ramanan& Rajendran 2003
Krishnamurthy et.al,2004
Ghamari 2008
Chan 2001

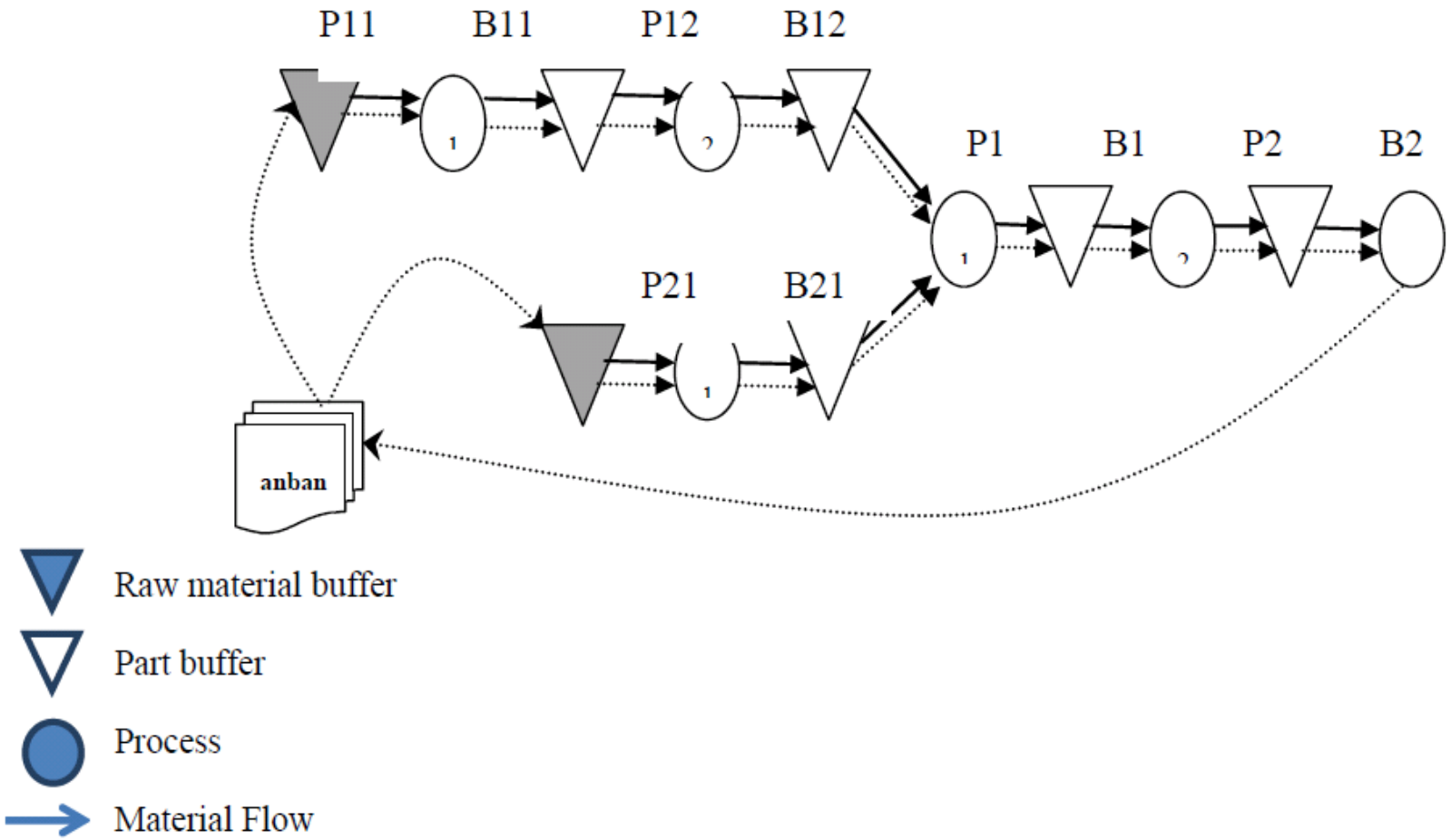
Comparing Kanban,CONWIP and Hybrid policies in a Multi-Level Multi Product system using DE Simulation

	Comparison between				Productio n line		Product		Method	
	Push system	Kanban	CONWIP	Hybrid	Multi-Level	Single-level	Multi-Product	Single-Product	Simulation	Analytical
Sharmaa and Agrawalb, 2009		×	×	×		×		×	×	
Ghamari, 2008		×	×		×			×	×	
Ip et.al, 2007			×	×	×		×			×
Takahashi et.al., 2005		×	×	×		×		×		×
Krishnamurthy et.al, 2004	×	×			×		×		×	

KANBAN System



CONWIP System

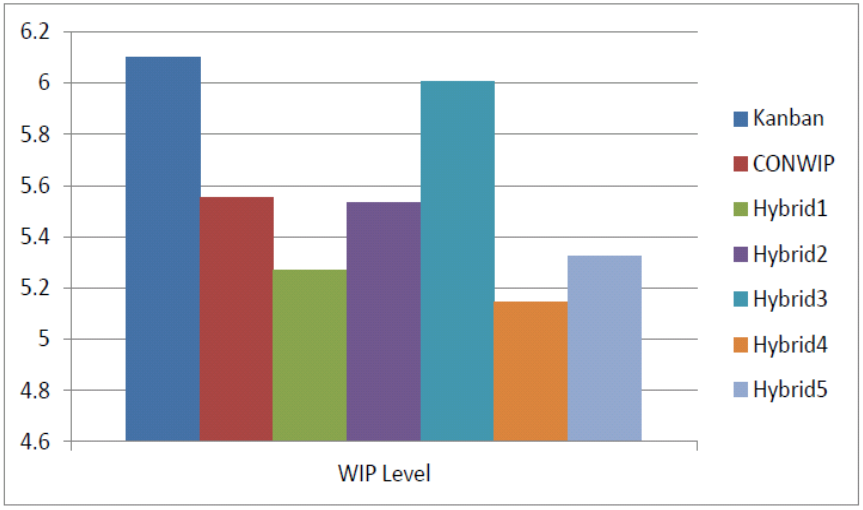


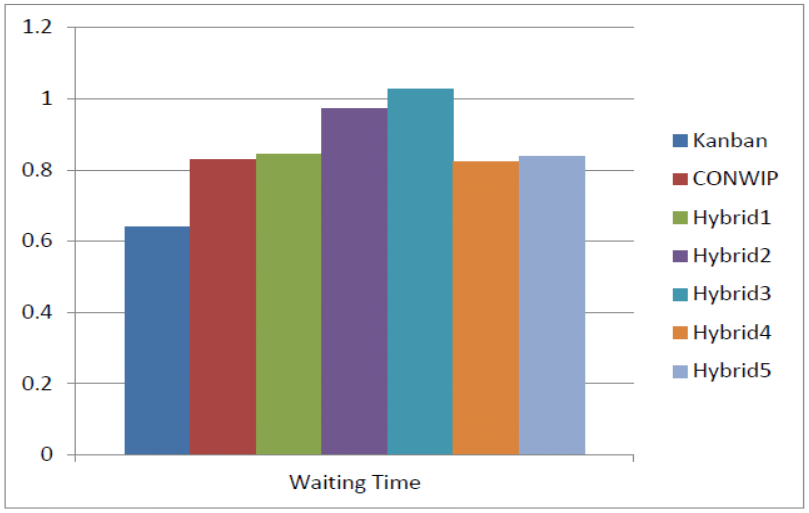
Results

	Kanban		CONWIP		Hybrid1		Hybrid2		Hybrid3		Hybrid4		Hybrid5	
	Average value	Maximum value	Average value	Maximum value	Average value	Maximum value	Average value	Maximum value	Average value	Maximum value	Average value	Maximum value	Average value	Maximum value
Work in process	6.138	9.700	5.555	148.0	5.267	148.0	5.534	148.0	6.006	148.0	5.142	148.0	5.322	148.0
Lead Time (hr)	1.002	2.594	1.208	6.424	1.215	6.191	1.344	7.047	1.402	6.7409	1.187	6.217	1.202	5.4724
Process Time (hr)	0.360	0.938	0.378	2.990	0.372	2.648	0.373	2.539	0.375	2.4816	0.363	3.527	0.363	2.1743
Waiting Time (hr)	0.641	1.555	0.830	3.434	0.843	3.681	0.971	4.564	1.026	4.8331	0.824	3.915	0.838	3.4149

Comparison

- Comparisons are made based on WIP Level, Waiting Time, Processing Time, and Lead Time





Future Research

- Using decision-making models to select the superior production control policy
- Application of Fuzzy Control Systems for selecting production policies
- Application of Artificial Intelligence for smart production control policies