

TAKT PRODUCTION AS OPERATIONS STRATEGY: CLIENT'S PERSPECTIVE TO VALUE-CREATION AND FLOW

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BACKGROUND & RESEARCH GAP

- Takt production - rapid interest globally and in Finland
- However, R&D efforts mostly conducted through the lenses of GC and production (flow) effectiveness, with little focus on client value
- Previous studies, e.g., Dlouhy et al. (2017), Binninger et al. (2017):
 - value-creation with process-driven approach
 - takt time as a nominator between demand and supply

RESEARCH AIM

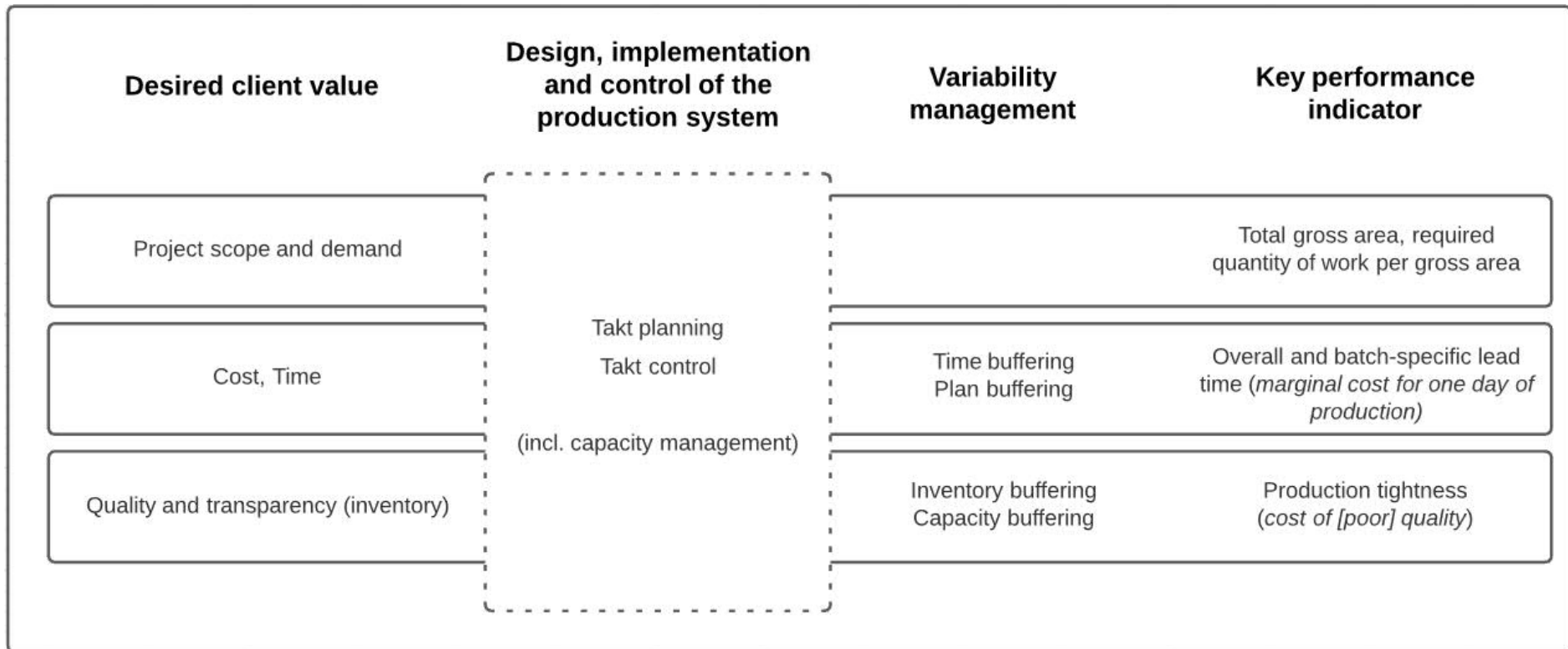
- In this study, we approach takt production as a form of a project's operations strategy – refined lenses towards operations management
- We propose a framework and KPIs to address takt production system's performance – allows clients to
 - evaluate their takt production decisions
 - evaluate contractors' capability to succeed with takt production
 - promote long-term flow-efficiency improvement

OPERATIONS STRATEGY DEFINITION

Operations strategy as an act of designing, implementing, and controlling the portfolio of demand, time, cost, inventory, capacity, and variability [with adequate buffer portfolio] to best achieve a company's (or project's) financial and marketing goals.

(Adopted from Pound et al. 2014)

TAKT PRODUCTION AND OPERATIONS STRATEGY



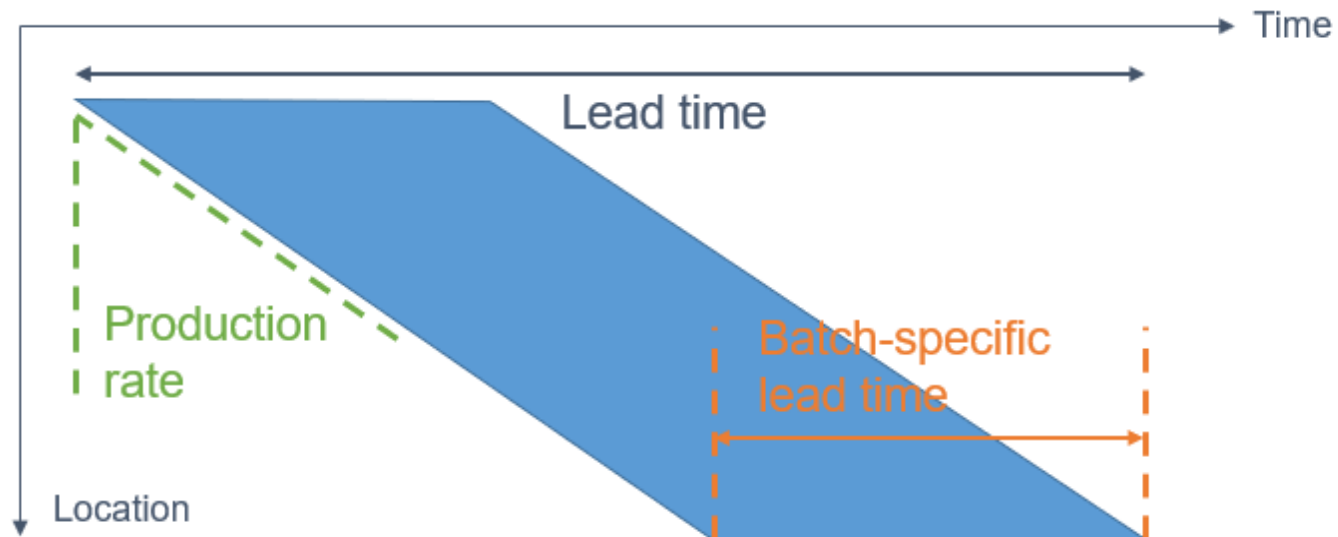
CASE EXAMPLE

- IPD
- Hospital
- 700+ Meur
- 150 000 m²

The client has requested a takt production approach to seek lead time reduction opportunities and increase transparency during production.

CASE EXAMPLE

- Batch-specific lead time [h] = Quantity of work [h/m²] x Production tightness [m²/worker]
- Production rate [m²/h] = Capacity [n:o of workers] / Quantity of work [h/m²]
- Lead time [h] = Total gross area [m²] / Production rate [m²/h] + Batch-specific lead time [h]



CASE EXAMPLE

Building	Type	gross m2	Quantity of work (hours) per phase					Finishes	
			Demolition	Earthworks	Foundations	Struct. & exter.	Interior 1		Interior 2
East	New building	7 800		4 000	10 000	61 000	15 400	40 200	52 200
Main North 1	New building	24 000		2 000	7 500	83 500	38 500	117 400	156 800
Main North 2	New building	24 000		2 000	7 500	83 500	38 500	117 400	156 800
Main South 1	New building	24 000		2 000	7 500	83 500	38 500	117 400	156 800
Main South 2	New building	24 000		2 000	7 500	83 500	38 500	117 400	156 800
North	New building	11 300		650	7 800	65 000	11 700	55 400	73 500
Building 1	Renovation	6 670	65 500	700	15 200	29 000		26 200	29 500
Building 2	Renovation	8 200	65 500	700	15 200	29 000		43 800	49 500
Building 3	Renovation	7 900	65 500	700	15 200	29 000		41 600	45 900
Total quantity of work			196 500	14 750	93 400	547 000	181 100	676 800	877 800
Estimated tightness (m2 / worker)			100	75	75	120	100	100	100
Takt time (d)			1	5	5	5	1	1	1
Average takt area size (m2)			200	200	200	1000	200	200	200
Amount of wagons			106	9	9	12	19	59	79

	Gross areas per functional area (m2) / amount of takt areas in the interior phase								
	K2	K1	1	2	3	4	5	6	7
		820 / 5	1940 / 11	460 / 3	1680 / 10	270 / 2	1680 / 10	270 / 2	420 / 2
3030 / 16	3260 / 17	3130 / 16	2960 / 15	2960 / 15	2940 / 15	2920 / 15	1900 / 10	890 / 5	
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3030 / 16	3260 / 17	3130 / 16	2960 / 15	2960 / 15	2940 / 15	2920 / 15	1900 / 10	890 / 5	
		320 / 2	2720 / 13	2850 / 14	2860 / 14	2560 / 13			
			1620 / 5	1680 / 6	1130 / 4	1130 / 4	1120 / 4		
		530 / 2	1570 / 7	1570 / 7	1560 / 7	1560 / 7	1410 / 6	10 / 0	
		280 / 1	1560 / 7	1570 / 7	1560 / 7	1560 / 7	1410 / 6	40 / 0	

CASE EXAMPLE

1

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CASE EXAMPLE

Quantity of work (hours) per phase

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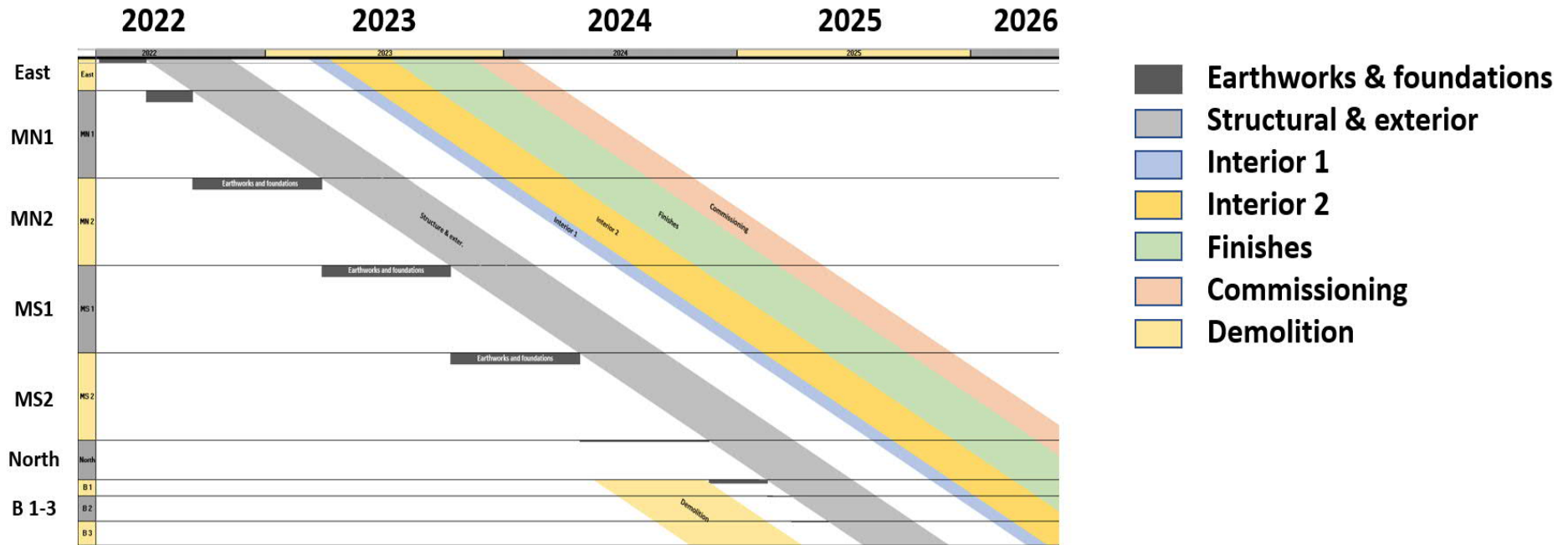
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	530 / 2	1570 / 7	1570 / 7	1560 / 7	1560 / 7	1410 / 6	10 / 0		
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2

Estimated tightness (m2 / worker)	100	75	75	120	100	100	100
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CASE EXAMPLE



CONCLUSIONS

- The approach was observed to give the client a tangible way to address the value-created by different takt plan parameters, also aiding flow
- Proactive role of client is central for takt production operations development
- Further research could incorporate
 - Validation of the value created with the presented approach
 - Benchmarking contractor capabilities with the proposed metrics

THANK YOU!

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