



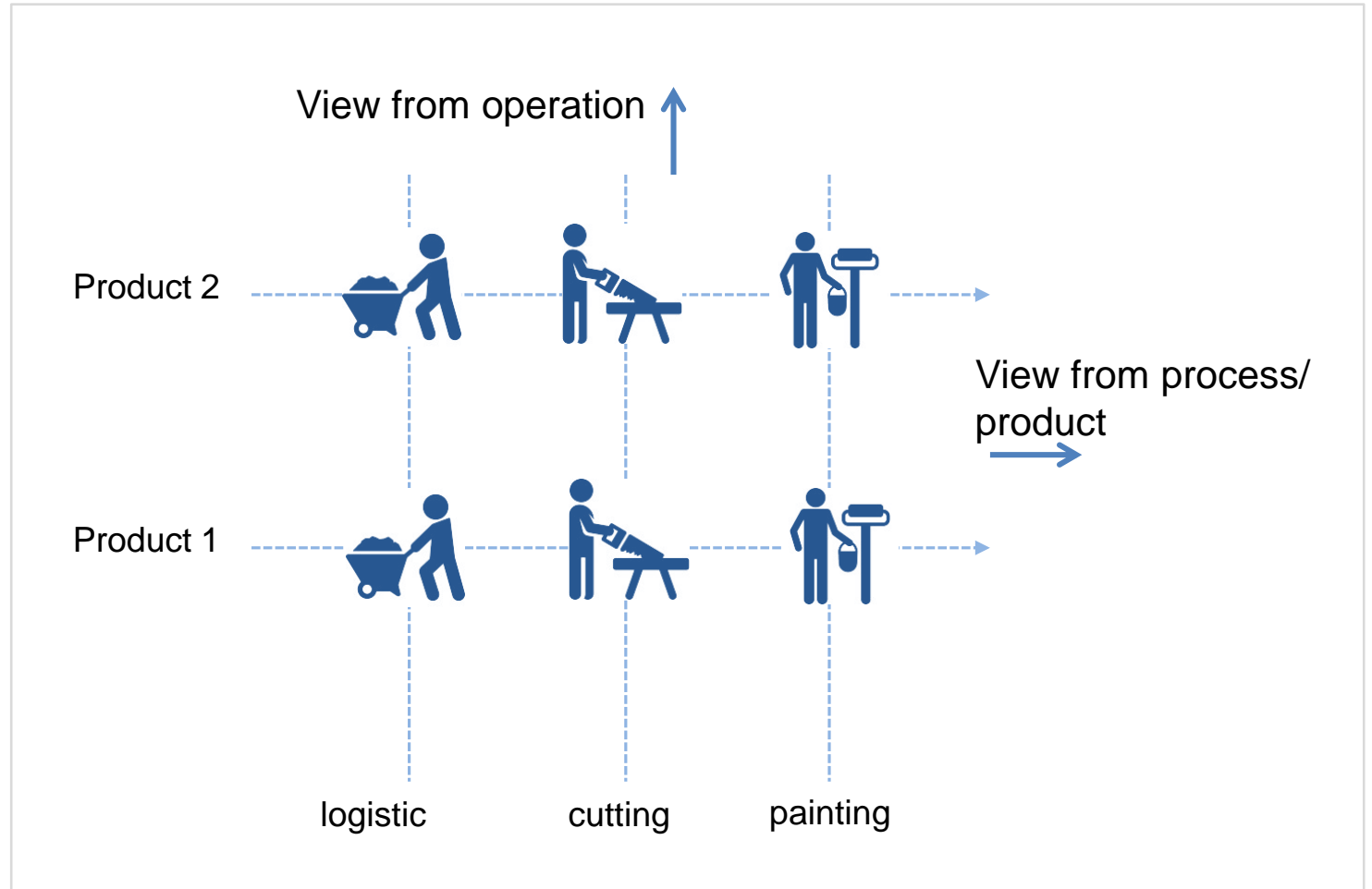
FLOW IN TAKTED PROJECTS – A PRACTICAL ANALYSIS OF FLOW AND RESOURCE EFFICIENCY

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- Research question
How well can flow in takt production be planned and controlled?
- Method:
Literature review about takt and flow
Development of a measurement system for flow in takt projects

Basics of flow (1/2): Flow perspectives

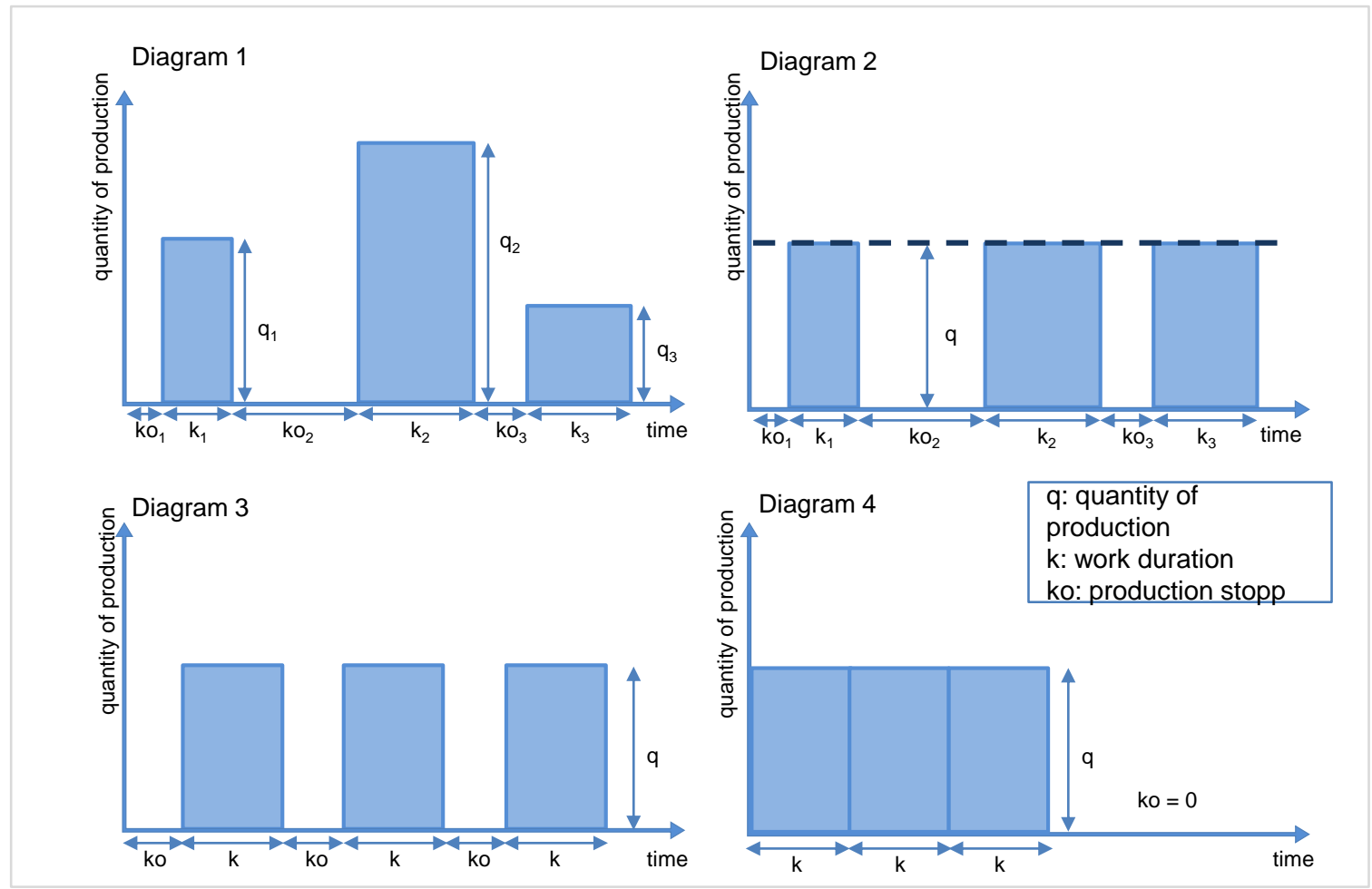
- Product flow
- Operation flow



Basics of flow (2/2): Properties of flow

- Consistency
- Rhythm
- Continuity

- Flow efficiency (location)
- Flow efficiency (trade)



Perspectives and properties of flow in takt projects

- Consistency ✓
- Rhythm ✓
- Continuity

Taktplan Norm P4 Soll

Jahr	2013																																					
Kalenderwoche	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41							
Takt	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31							
TB 1: HA DG	TB1	E1	HLS1	M1	TB2	FBH	EST	E2	M2	FL1	E3	HLS2	BO1	SR1																								
TB 2: HA OG2		TB1	E1	HLS1	M1	TB2	FBH	EST	E2	M2	FL1	E3	HLS2	BO1	SR1																							
TB 3: HA OG1			TB1	E1	HLS1	M1	TB2	FBH	EST	E2	M2	FL1	E3	HLS2	BO1	SR1																						
TB 4: HA EG				TB1	E1	HLS1	M1	TB2	FBH	EST	E2	M2	FL1	E3	HLS2	BO1	SR1																					
TB 5: HB DG					TB1	E1	HLS1	M1	TB2	FBH	EST	E2	M2	FL1	E3	HLS2	BO1	SR1																				
TB 6: HB OG2						TB1	E1	HLS1	M1	TB2	FBH	EST	E2	M2	FL1	E3	HLS2	BO1	SR1																			
TB 7: HB OG1							TB1	E1	HLS1	M1	TB2	FBH	EST	E2	M2	FL1	E3	HLS2	BO1	SR1																		
TB 8: HB EG								TB1	E1	HLS1	M1	TB2	FBH	EST	E2	M2	FL1	E3	HLS2	BO1	SR1																	
TB13: HD DG									TB1	E1	HLS1	M1	TB2	FBH	EST	E2	M2	FL1	E3	HLS2	BO1	SR1																
TB 14: HD OG2										TB1	E1	HLS1	M1	TB2	FBH	EST	E2	M2	FL1	E3	HLS2	BO1	SR1															
TB 15: HD OG1											TB1	E1	HLS1	M1	TB2	FBH	EST	E2	M2	FL1	E3	HLS2	BO1	SR1														
TB 16: HD EG												TB1	E1	HLS1	M1	TB2	FBH	EST	E2	M2	FL1	E3	HLS2	BO1	SR1													
TB13: HC DG													TB1	E1	HLS1	M1	TB2	FBH	EST	E2	M2	FL1	E3	HLS2	BO1	SR1												
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Taktplan Norm P4 Ist

Jahr	2013																																						
Kalenderwoche	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46			
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- Flow efficiency (location)
- Flow efficiency (trade)

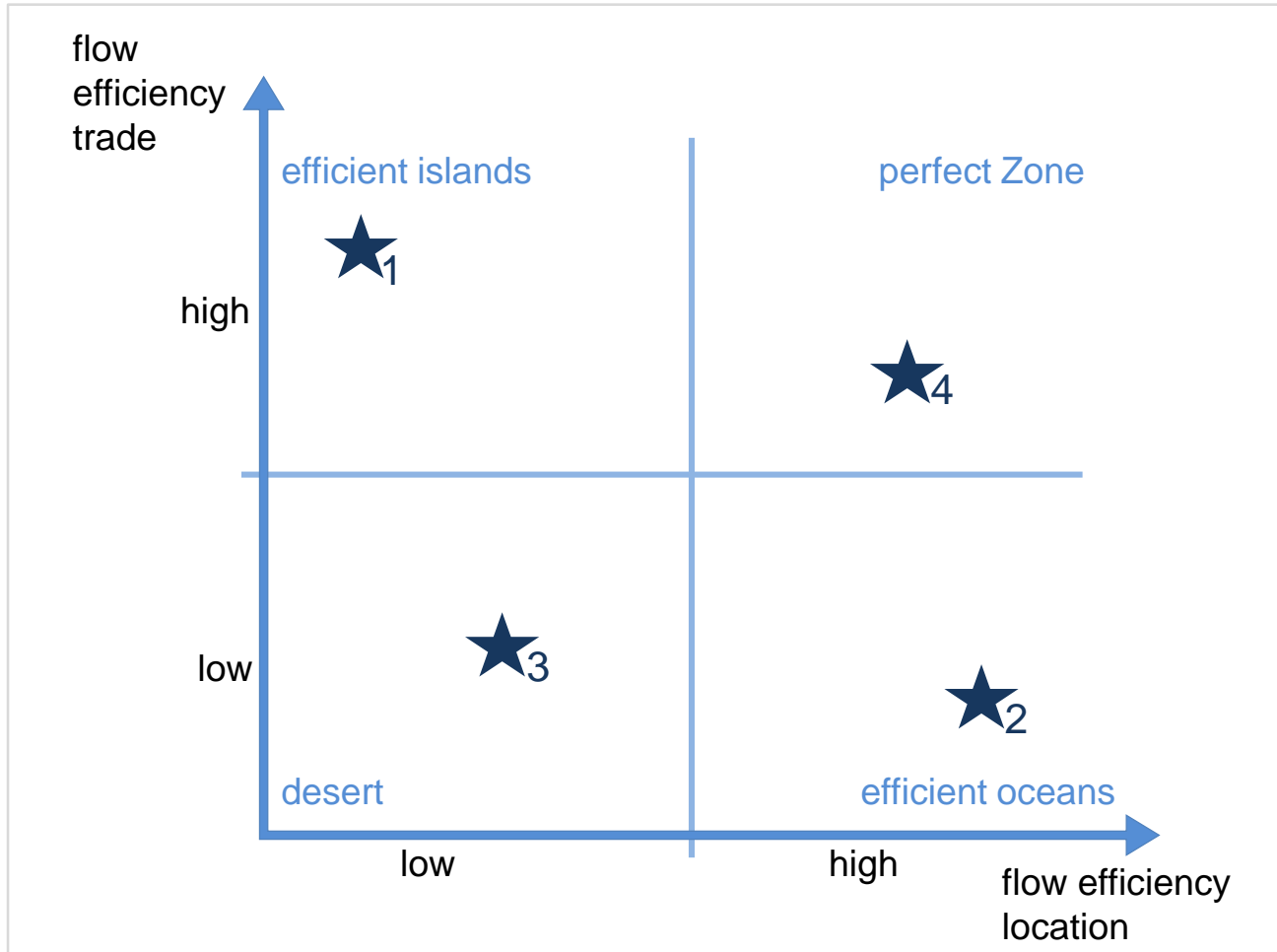
Measuring continuity?

	TT1	TT2	TT3	TT4	TT5	TT6	TT7	TT8	TT9	TT10	TT11	TT12	TT13	TT14	TT15	TT16	TT17	TT18
TA1	W1	W2	W3	1	2	W4	3	W5	4	5	6	W6						
TA2		W1	W2	W3			W4		W5			W6						
TA3			W1	W2	W3			W4		W5			W6					
TA4				W1	W2	W3		W4			W5		W6					
TA5					W1	W2	W3		W4			W5		W6				
TA6								W1	W2	W3	W4			W5	W6			
TA7									W1	W2	W3	W4			W5			W6
TA8										W1	W2	W3		W4		W5	W6	
		1	2	3	4	5	1	2	6	7	8							

- Flow efficiency (location) = 6 / (6+6) = 50%
- Flow efficiency (trade) = 8 / (8+2) = 80%

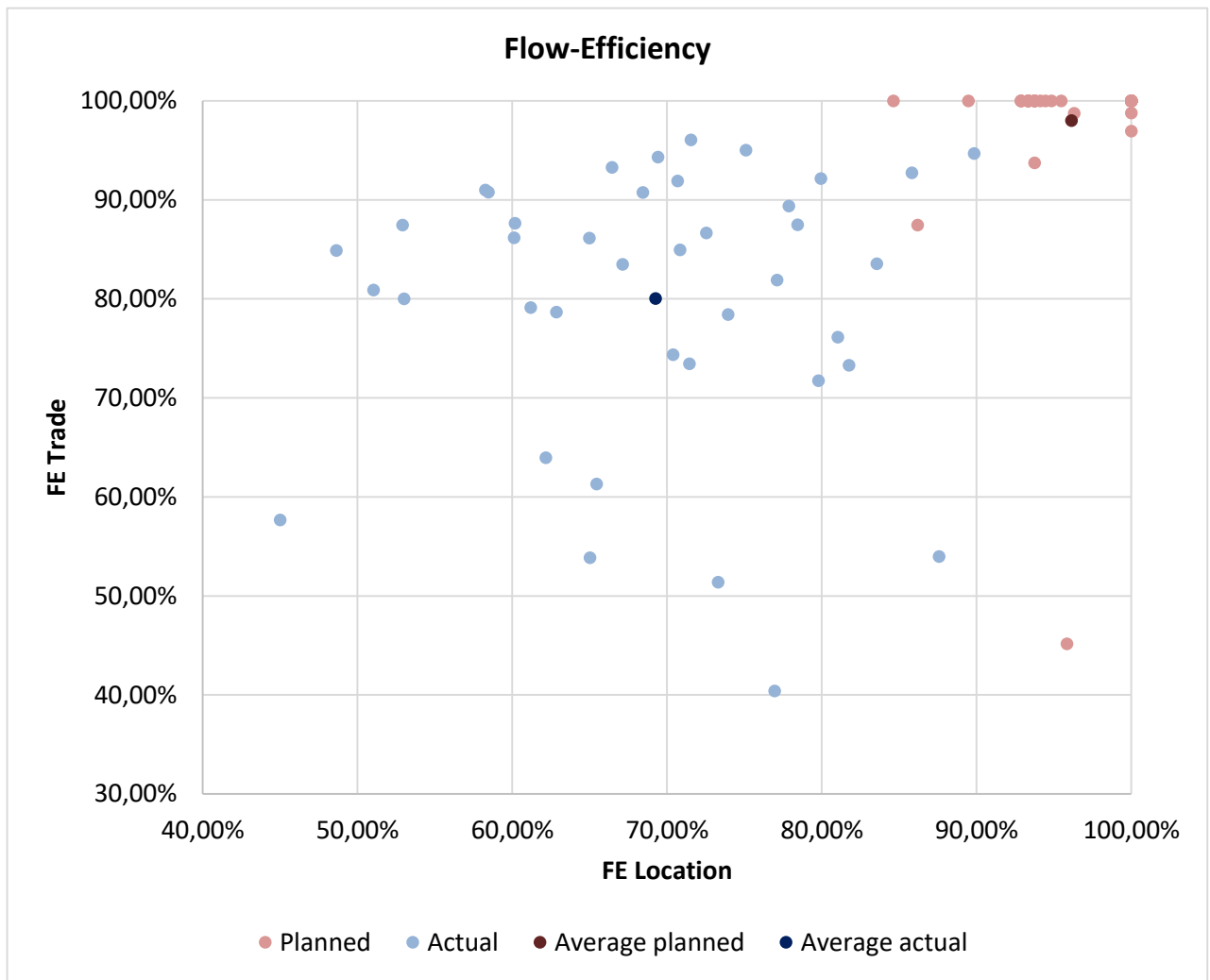
$$FE [-] = \frac{\text{filled boxes}[-]}{\text{filled boxes} [-] + \text{empty boxes} [-]}$$

Measuring continuity?



How well can flow in takt production be planned and controlled?

	Planned	Actual
FE Trade	98,02 %	80,03 %
FE Location	96,13 %	69,25 %



Findings and Conclusion

1. Reduction in flow efficiency during Takt Control
2. Differences in flow efficiency between the location and trade perspectives are notable