Applying FRAM

for the

Analysis of Interdependencies within the Organ Allocating Function of Swisstransplant

GCS / Swisstransplant
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Cross-fertilization

- The „aviation“ eye and the „aviation“ terminology
- Safety II vs. Safety I
- Operational Management

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Scope/Object

- Allocation of organs (QM-Handbuch Ch 1)
- Dispatch of organs (QM-Handbuch Ch 2)
- Operational Control: Responsibility for initiation, continuation, diversion and termination of a „flight“ with respect to safety

- Is FRAM the adequate method to analyse the scope/object?
- Is SWT a linear or a non-linear system? Tractable or Intractable?

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Methodology (1)

- Task Analysis
- FRAM

- Mind-Set ready?

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Methodology (2)

- Interviews
- Identification of functions
- Variability – Instantiation(s)
- Functional Resonance/couplings

- Full Use of FMV? Training level of user?
- Time pressure
- How to get a practical use of results?

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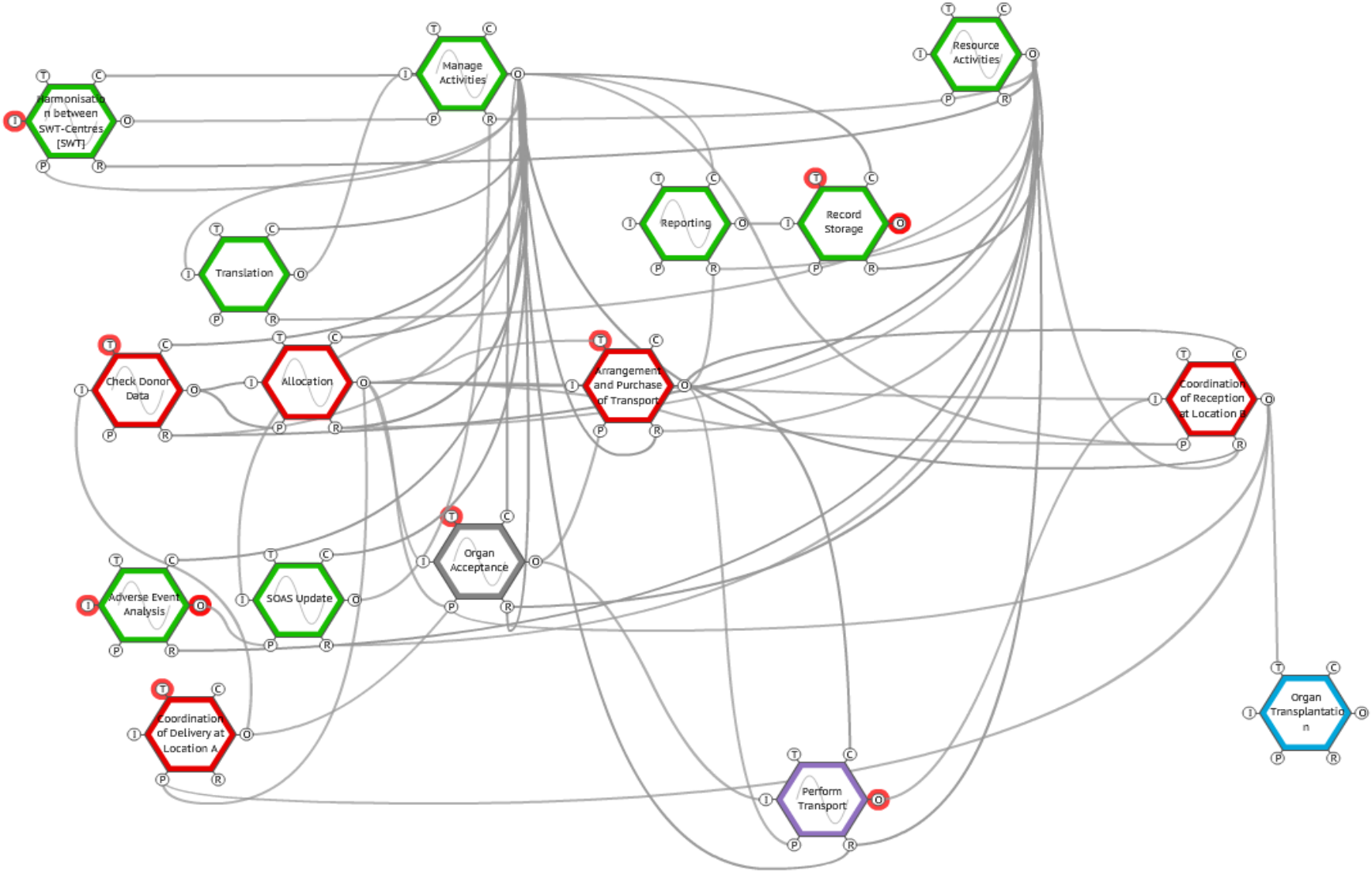
Functions (long)

- Check Donor Data
- Allocation
- Arrangement and Purchase of Transportation
- Coordination of Delivery at Location A
- Coordination of Reception at Location B
- Harmonisation between SWT-Centres
- Manage Activities
- Resource Activities
- Reporting
- Record Storage
- Adverse Event Analysis
- SOAS Update
- Organ Acceptance
- Perform transport
- Organ Transplantation
- Translation



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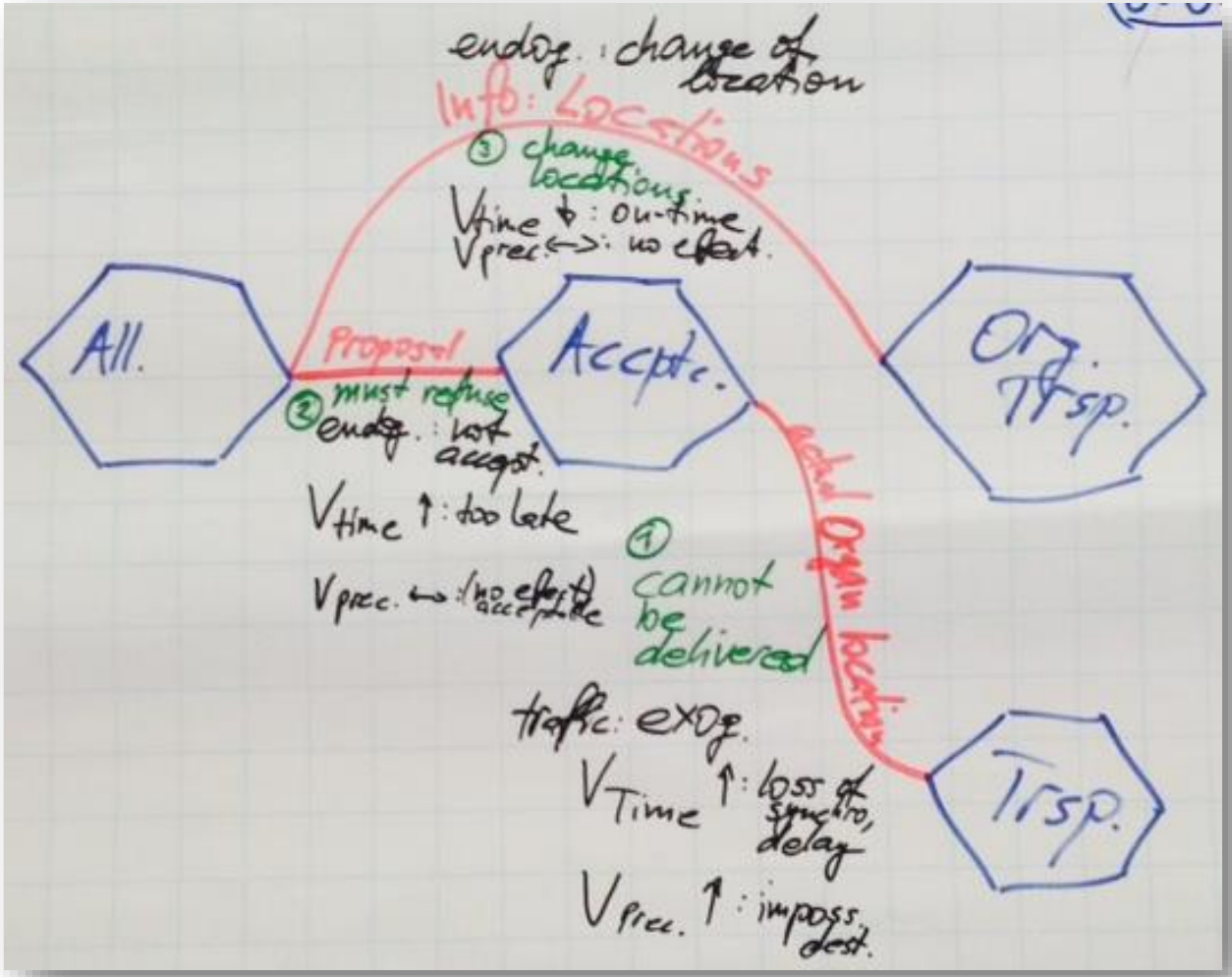
Input	Step 1	Step 2	Step 3	Output
Donor organ available	Check donor data	Allocation	Transportation Control	Organ delivered to receiver
Input	raw data	validated data	allocated organ at A	
Output	validated data	allocated organ at A	Allocated organ at B	
Functions (transversal/upstream) BACKGROUND	4, 5, 7, 8	4, 5, 7, 8	4, 5, 7, 8	Database/Organisation/System maintenance: 6, 9, 10, 11, 12, 16
Functions (downstream) FOREGROUND	1, 4	2, 13	3, 14	15
Variability endogenous	• transcription errors • selection of info • wrong data • missing data	• non-acceptance of organ • virtual X-match mistakes • need to interpret SOAS-generated matches • Software bugs	• Availability of means • lack of time	
exogenous	• night • opening hours • lack of specialist	• Malfunction of communication tools • Office hour limitations • time restricted (organ shelf-life) •	• Traffic situation (→ time) • Weather conditions (→time) • Time consuming complications during explantation • Time used for explantation • Delays in explantations	
functional up-/downstream coupling	• lack of SWT personnel • lack of sufficient time to administer more than 1 case simultaneously • poor procedures	• Poor procedures	•	

Reasoning



Functions (abbrev.)

- Allocation of Organ by SWT
- Acceptance by Receiving Centre
- Control of Transport by SWT
- Transport by Service Provider

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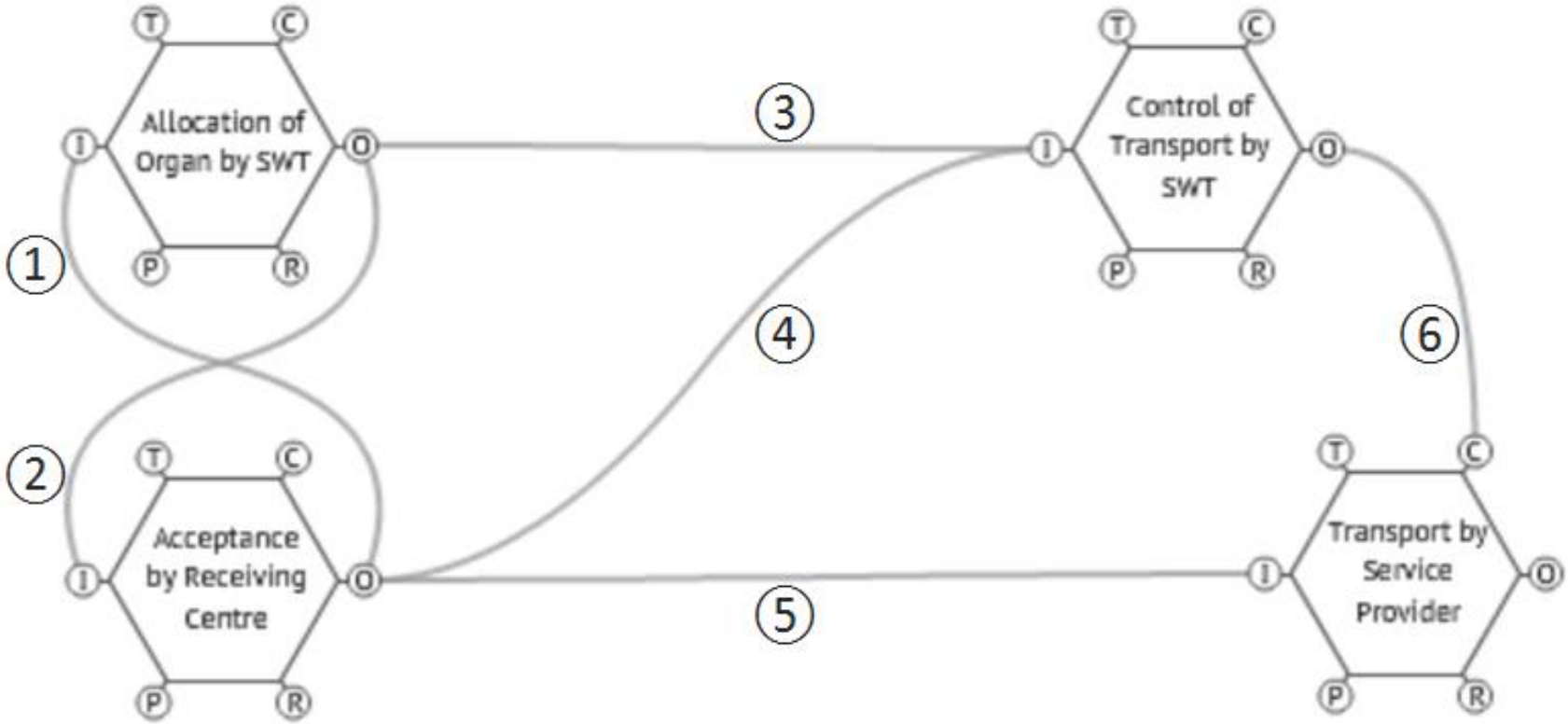
Instantiation (abbrev.)



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#	Upstream Function	Coupling	Variability Type
①	Acceptance by Receiving Centre	Refusal	V_{time} ↑ too late $V_{Precision}$ ↔ no effect
②	Allocation of Organ by SWT	Proposal	V_{time} ↑ too late $V_{Precision}$ ↔ no effect
③	Allocation of Organ by SWT	Info Locations	V_{time} ↓ dampening effect on time-criticality (return to on-time and synchronisation) $V_{Precision}$ ↔ no effect
④	Acceptance by Receiving Centre	Acceptanc e	V_{time} ↔ no effect $V_{Precision}$ ↔ no effect
⑤	Acceptance by Receiving Centre	Actual location of Organ	In case of delayed delivery V_{time} ↑ loss of synchronization & too late (delay) $V_{Precision}$ ↑ Impossibility to deliver at destination B In case of on-time transport progress V_{time} ↔ no effect $V_{Precision}$ ↔ no effect
⑥	Control of Transport by SWT	SLIDS	V_{time} ↔ $V_{Precision}$ ↔

Results

Main Variation Generators:

- Negotiating elements (proposal, refusal)
- Transportation delays.

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Dampening Effects

- National and local co-ordinator perform micro-management by
  - use of SLIDS, and
  - direct real-time communication/contact between stakeholders (national and local co-ordinators, transport company dispatchers)
  - Full availability of personnel (24/7/365)

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Our Uncertainties

- Why only time and precision related variance?
- Noticed fall-back into old habits
- Are the results of the analysis really based on the FRAM?
- ETTO consideration: Was FRAM a good methodological choice?