Outsourcing of participants in the Swiss real time gross settlement (RTGS) system

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Motivation

Central banks are concerned about outsourcing activities by RTGS participants at the interfaces to the RTGS

Fragmentation of process chain	Operational and systemic risks	Information gap
Outsourcing: SIC participants outsource activities to third party service providers	**Secure functioning of the payments system:** Risks impact SNB mandate	**Monitor:** Outsourcing magnitude and which participants take part
Insourcing: Service providers deliver activities to a number of SIC-participants		**Actions:** Take measures to mitigate risks, if necessary

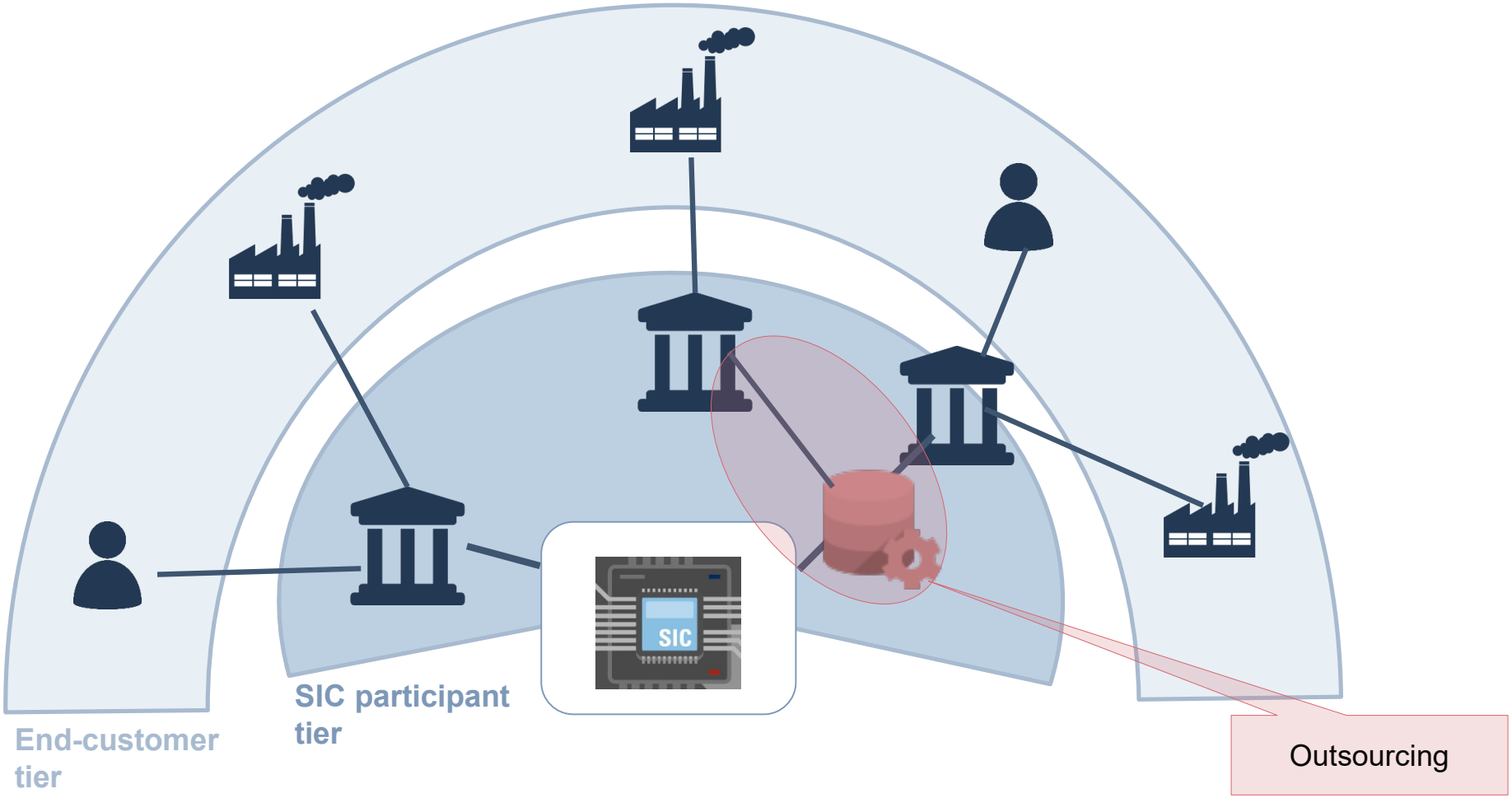
Service Provider increase and mitigate risk

Type	Risk	Definition	Increases	Mitigates
Direct risks endangering the mandate	Operational risk	Diminished service level or outage of provided service	Operational complexity: Additional interfaces, fragmented competences and know-how transfer Information asymmetries (agent-principal): loss of control and incentive to inferior service quality	Specialization and incentive to better service quality
Risk amplifying the harm of direct risks	Systemic risk	More than one participant is affected by a party not able to deliver its service	Concentration amplifies the negative impact of a operational disturbance at a service provider to numerous participants: clients and non clients	-

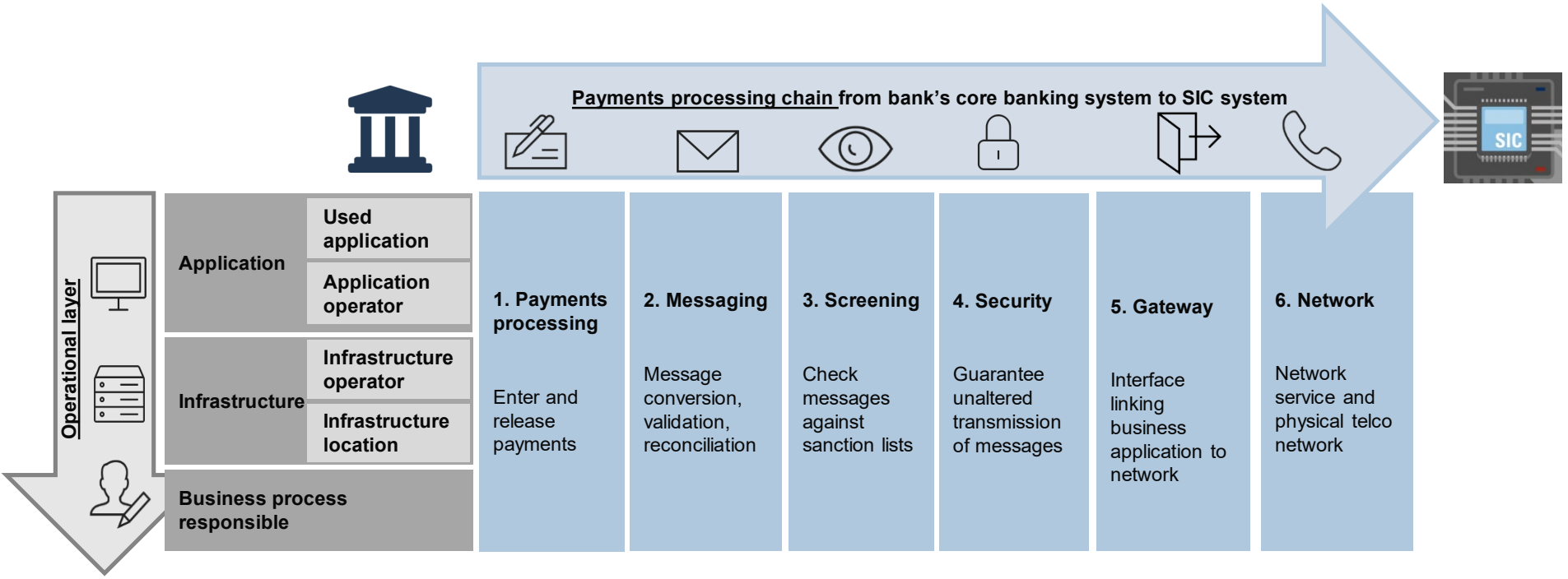
What we do…

1. Develop a two-dimensional conceptual framework of outsourcing at the interface to the RTGS
2. Collect data along this framework with a regularly conducted survey
3. Provide systematic empirical study analysing the
    1. Magnitude of the outsourcing at the interface
    2. Identify participants inclined to outsourcing

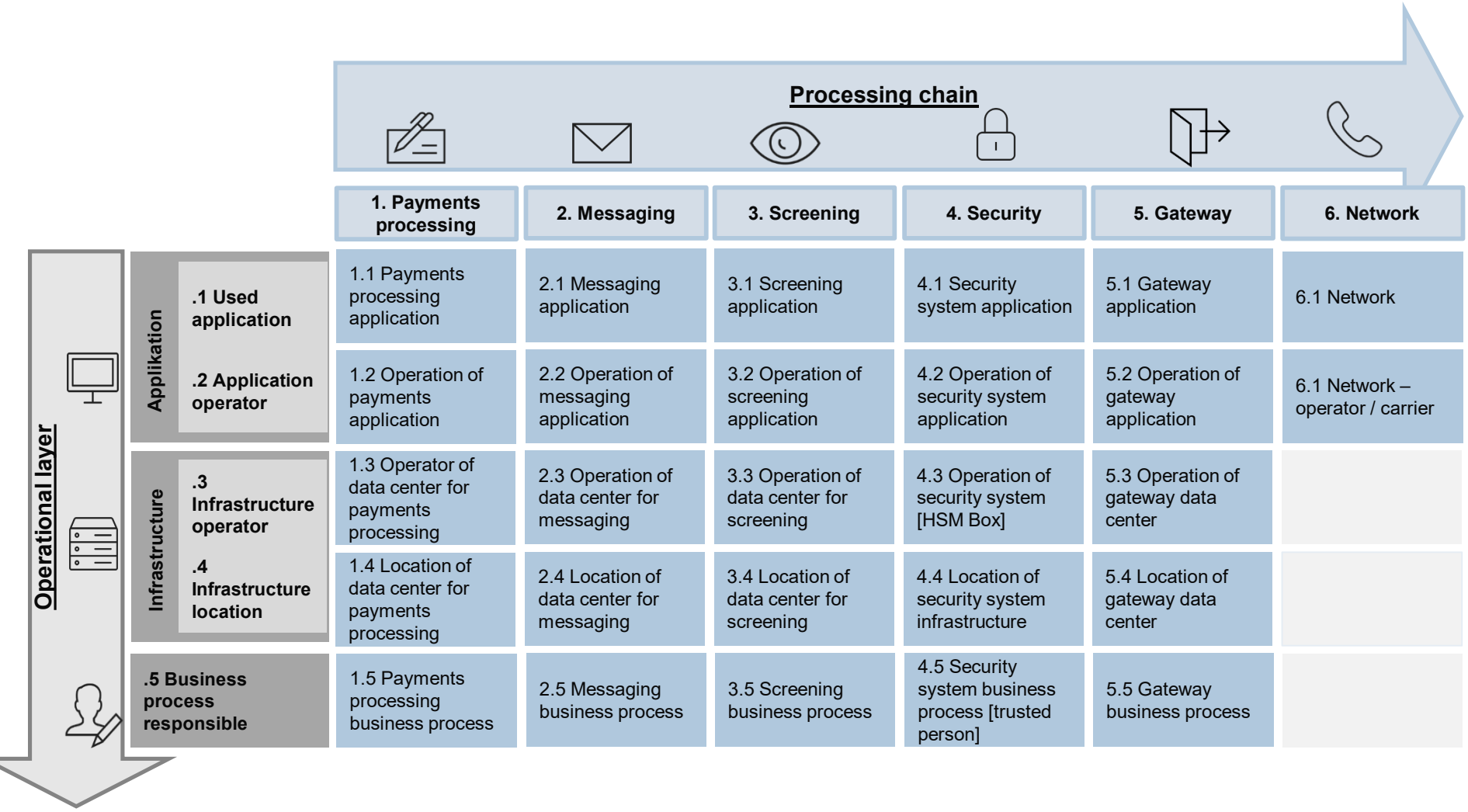
Tiered SIC payments system - outsourcing at the interface



Two dimensional framework of the interface: processing chain and operating layer

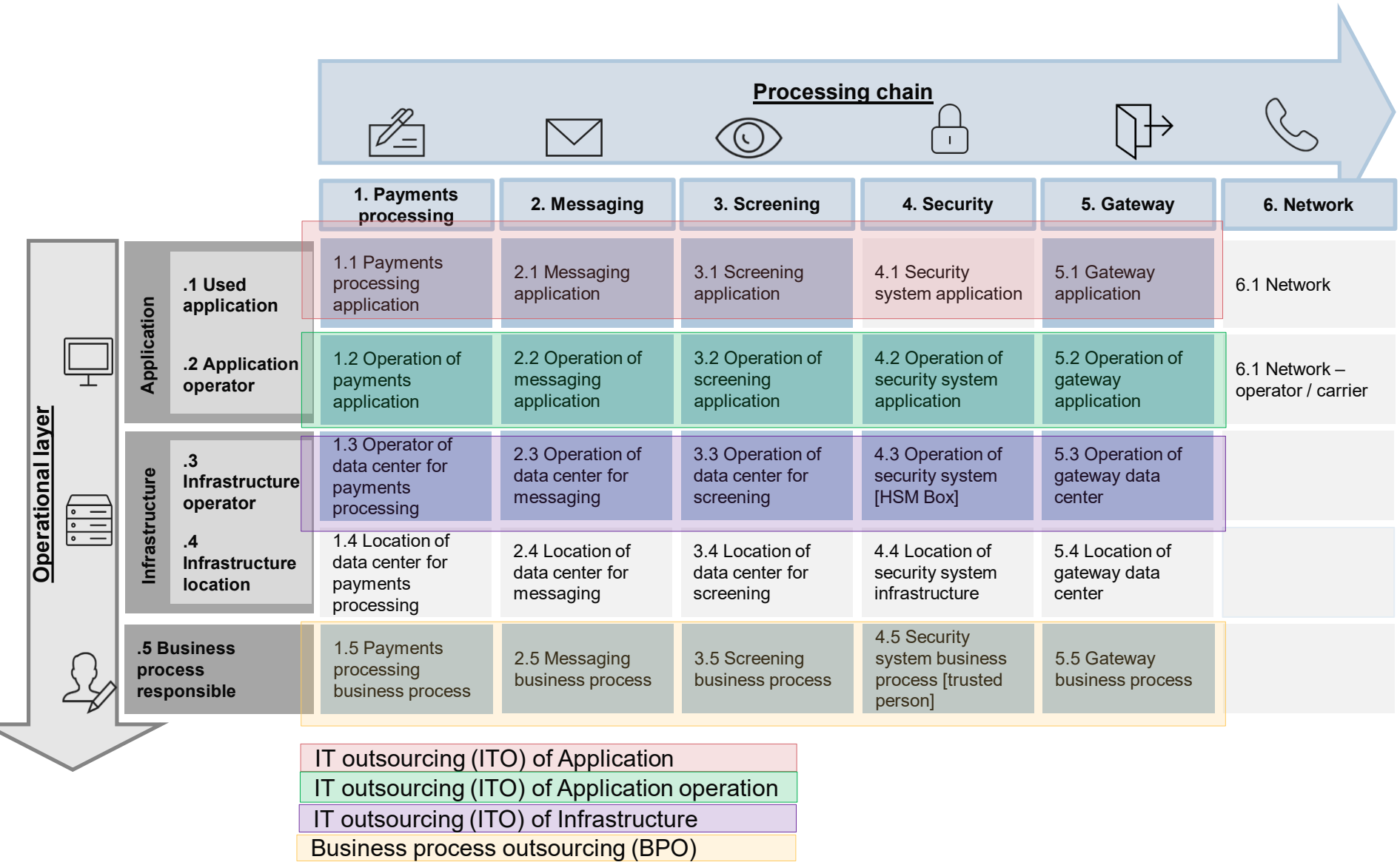


IT outsourcing and Business process outsourcing

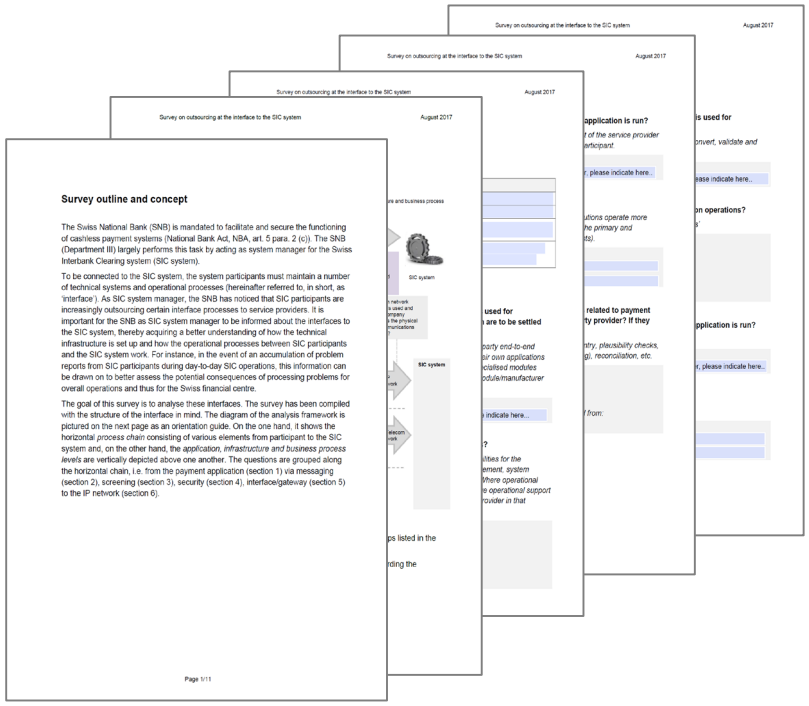


Operational layer		1. Payments processing	2. Messaging	3. Screening	4. Security	5. Gateway	6. Network
Applikation	.1 Used application	1.1 Payments processing application	2.1 Messaging application	3.1 Screening application	4.1 Security system application	5.1 Gateway application	6.1 Network
Applikation	.2 Application operator	1.2 Operation of payments application	2.2 Operation of messaging application	3.2 Operation of screening application	4.2 Operation of security system application	5.2 Operation of gateway application	6.1 Network – operator / carrier
Infrastructure	.3 Infrastructure operator	1.3 Operator of data center for payments processing	2.3 Operation of data center for messaging	3.3 Operation of data center for screening	4.3 Operation of security system [HSM Box]	5.3 Operation of gateway data center	
Infrastructure	.4 Infrastructure location	1.4 Location of data center for payments processing	2.4 Location of data center for messaging	3.4 Location of data center for screening	4.4 Location of security system infrastructure	5.4 Location of gateway data center	
	.5 Business process responsible	1.5 Payments processing business process	2.5 Messaging business process	3.5 Screening business process	4.5 Security system business process [trusted person]	5.5 Gateway business process	

IT outsourcing and Business process outsourcing



Timeline of data collection with the survey



2015: Pilot survey to test conceptual framework

2016: 1st Service Provider survey
- Voluntary
- Response rate of 56%, representing 70% of volume

April 2017: Obligation to disclose information

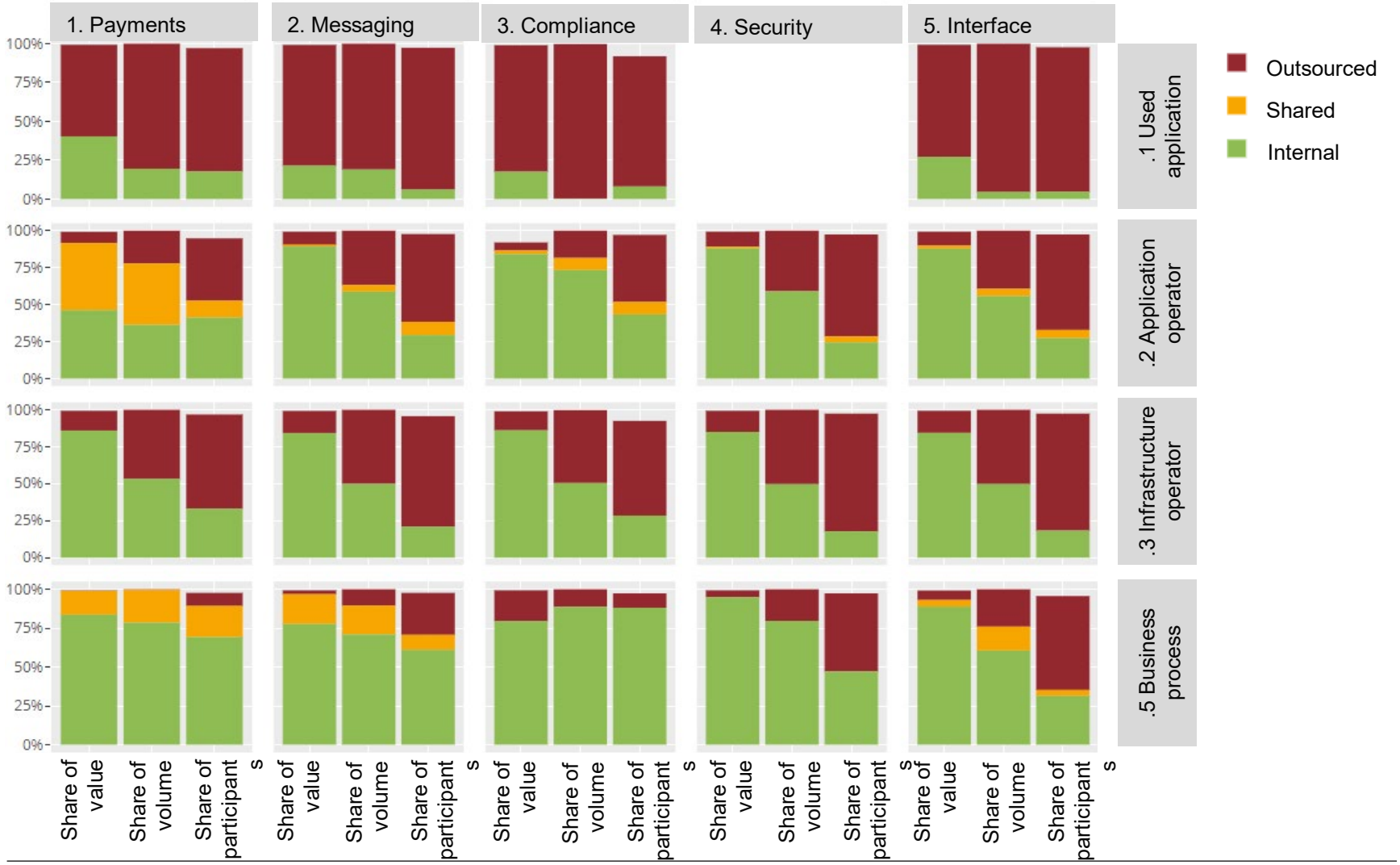
2017: 2nd survey
- Mandatory
- Response rate of 99%, representing 99% of volume

2019: 3rd survey
- Including FMI with access to the SIC
- Pilot for online survey

2021:4th survey
- Response rate of 100%

2022: 5th survey
Response rate of 100%

Outsourcing Magnitude: participants with large values keep in-house, smaller participants outsource



Model

- Logit models with dependent binary variables*:*
  - Model 1: ITO_of_Application
  - Model 2: ITO_of_ApplicationOperation
  - Model 3: ITO_of_Infrastructure
  - Model 4: BPO

- Explanatory variables:
  - Retail transaction, as share of a banks transaction = business model proxy
  - Size (in SIC), as share of total value
  - Processtep
  - ITOutsourcingscore (only in BPO model)

- Data: sourcing survey (2021) combined with SIC transaction data, and SNB internal master data of SIC participants

Hypotheses

- H1: more ITO than BPO
- H2: the more ITO, the greater likelihood of BPO

- H3: business model does not impact ITO
- H4: business model does impact BPO

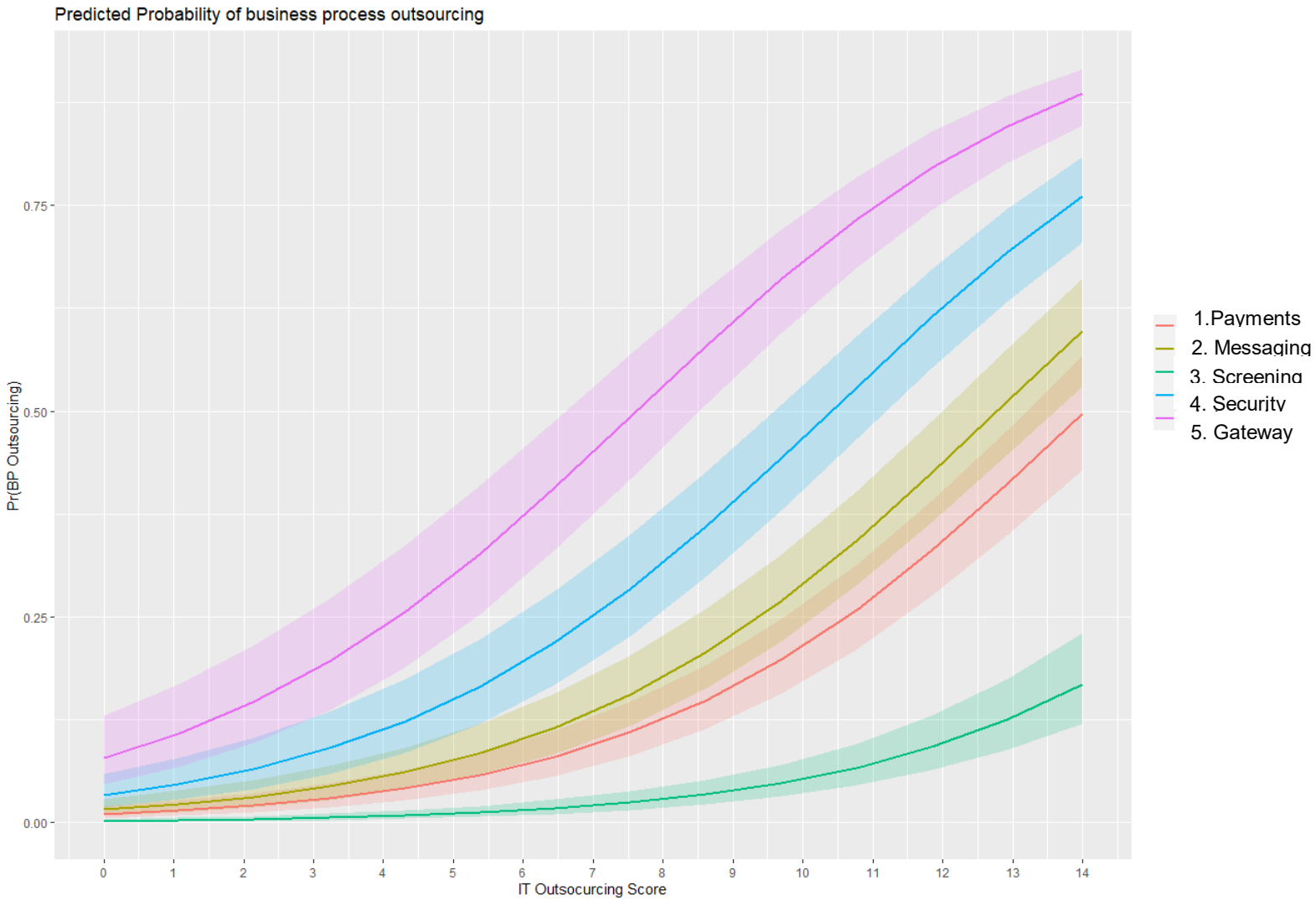
- Q: Is outsourcing related to size?

H1: More ITO than BPO

- Measured with predicted probability of outsourcing of the 4 logit models
- Higher probability of ITO than BPO

Predicted probability of Outsourcing	mean	Standard dev	min	max	N
ITO Application	0.91	0.07	0.25	0.97	1247
ITO Application Operation	0.68	0.16	0.0003	0.86	1572
ITO Infrastructure	0.78	0.15	0.0000	0.91	1557
BPO	0.39	0.28	0.002	0.90	1576

H2: the more ITO, the greater likelihood of BPO



H3: business model does not impact ITO
H4: business model does impact BPO

H3: business model does not impact ITO (example of ITO Infrastructure)

```
glm(formula = out_insourced ~ retailprcttrx + sicprctvalue +
    processstep, family = binomial(link = "logit"), data = d.sourcing_log_iti_clean)

Deviance Residuals:
    Min       1Q   Median       3Q      Max
-2.1730   0.4463   0.5087   0.7204   1.9314

Coefficients:
                       Estimate Std. Error z value Pr(>|z|)
(Intercept)              0.1092     0.1639   0.666 0.505235
retailprcttrx            1.1120     0.1521   7.311 2.64e-13 ***
sicprctvalue          -112.0319    22.3181  -5.020 5.17e-07 ***
processstep2_messaging    0.7735     0.1993   3.881 0.000104 ***
processstep3_screening    0.1971     0.1855   1.063 0.287841
processstep4_security     1.0407     0.2091   4.978 6.42e-07 ***
processstep5_gateway      1.0136     0.2079   4.876 1.08e-06 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

    Null deviance: 1652.0  on 1556  degrees of freedom
Residual deviance: 1457.4  on 1550  degrees of freedom
AIC: 1471.4

Number of Fisher Scoring iterations: 7
```

H4: business model does impact BPO

```
glm(formula = out_insourced ~ retailprcttrx + processstep + itoutsourcescore,
    family = binomial(link = "logit"), data = d.sourcing_log_bpo_clean)

Deviance Residuals:
    Min       1Q   Median       3Q      Max
-2.1555  -0.7331  -0.2969   0.7703   3.4035

Coefficients:
                       Estimate Std. Error z value Pr(>|z|)
(Intercept)            -4.95978    0.33065 -15.000  < 2e-16 ***
retailprcttrx           0.55655    0.17522   3.176  0.00149 **
processstep2_messaging  0.42478    0.18504   2.296  0.02170 *
processstep3_screening -1.59867    0.24072  -6.641 3.11e-11 ***
processstep4_security   1.19894    0.18721   6.404 1.51e-10 ***
processstep5_gateway    2.10678    0.20303  10.377  < 2e-16 ***
itoutsourcescore        0.32262    0.02442  13.210  < 2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

    Null deviance: 2116.9  on 1575  degrees of freedom
Residual deviance: 1515.8  on 1569  degrees of freedom
AIC: 1529.8

Number of Fisher Scoring iterations: 5
```

Q: Is outsourcing related to size?

```
glm(formula = out_insourced ~ retailprcttrx + sicprctvalue +
    processstep, family = binomial(link = "logit"), data = d.sourcing_log_iti_clean)

Deviance Residuals:
    Min       1Q   Median       3Q      Max
-2.1730   0.4463   0.5087   0.7204   1.9314

Coefficients:
                         Estimate Std. Error z value Pr(>|z|)
(Intercept)                0.1092     0.1639   0.666 0.505235
retailprcttrx              1.1120     0.1521   7.311 2.64e-13 ***
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(Dispersion parameter for binomial family taken to be 1)

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Number of Fisher Scoring iterations: 7
```

Conclusion

- Substantive differences between ITO and BPO – predicted probability of BPO lower than ITO, predicted probability of ITO > 0.5

- ITO decisions and BPO decisions seem to be linked, the higher the IT outsourcing score, the higher the predicted probability of BPO

- Outsourcing of SIC participants related to factors such as (retail) business models and firm size (SIC value)

Policy implications

- Fragmentation of the process chain on the interface to the SIC system is a real but also varied phenomenon

- Policy implications:
  - Important to continue monitoring out- and insourcing activities
  - Assess operational and systemic risks on a regular basis
  - If necessary, take measures to mitigate risks (RTGS guidelines for non-participants)

- Further research:
  - Service provider perspective
  - Evolution over time
  - Comparison with other RTGS
  - …

Thank you for your attention!

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