Module 5 –

Evaluation Designs and Methods

Methods 3 / 4
Qualitative comparative analysis (QCA)

Investigation of causality

Ontology

Probabilistic

Deterministic

QCA-Qualitative comparative analysis
(Boolean logic, elimination method)
N = medium

Regularity

Experiments (RCT)
Quasiexperiments
(„classic" counterfactual
designs)
N = large

MSSD/MDSD (Mills method of
difference/similarity) – cross-case (small
N) using logic of elimination
N = small

Congruence case study (within case, N =
1) using full range of Bayes on various
theories

Epistemology

Mechanistic

Process tracing
N = 1
(Bayes logic on the
unbroken causal chain)
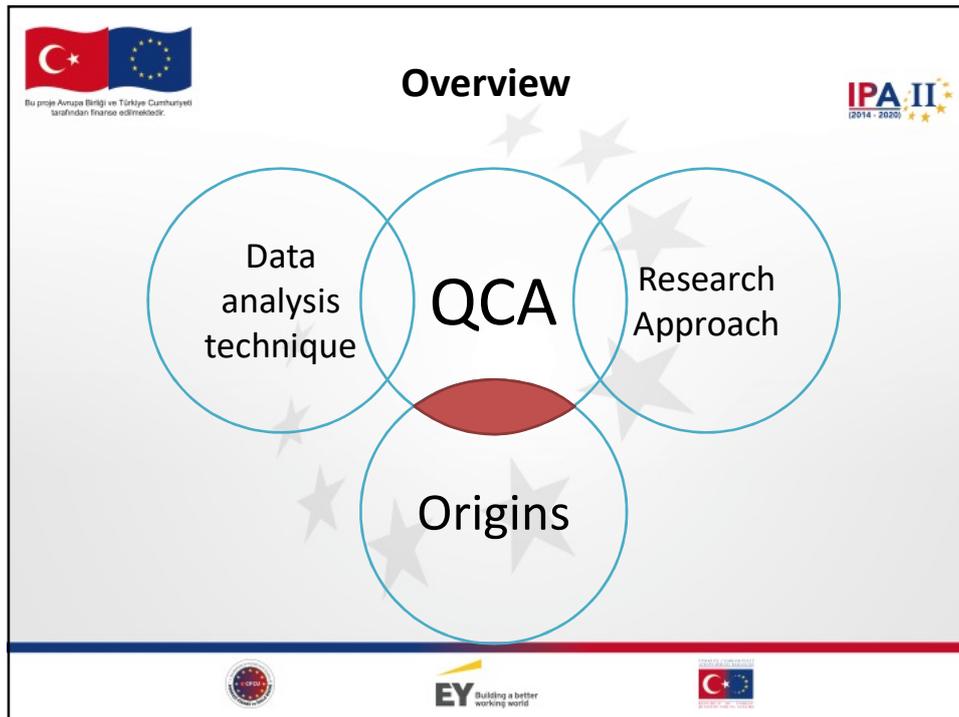
Overview

Data analysis technique

QCA

Research Approach

Origins

QCA

Is synthetic a comparative method, as is share features of both case-oriented methods (keeps relations within the case) and variable-oriented methods (works with large N and allows for good generalization).
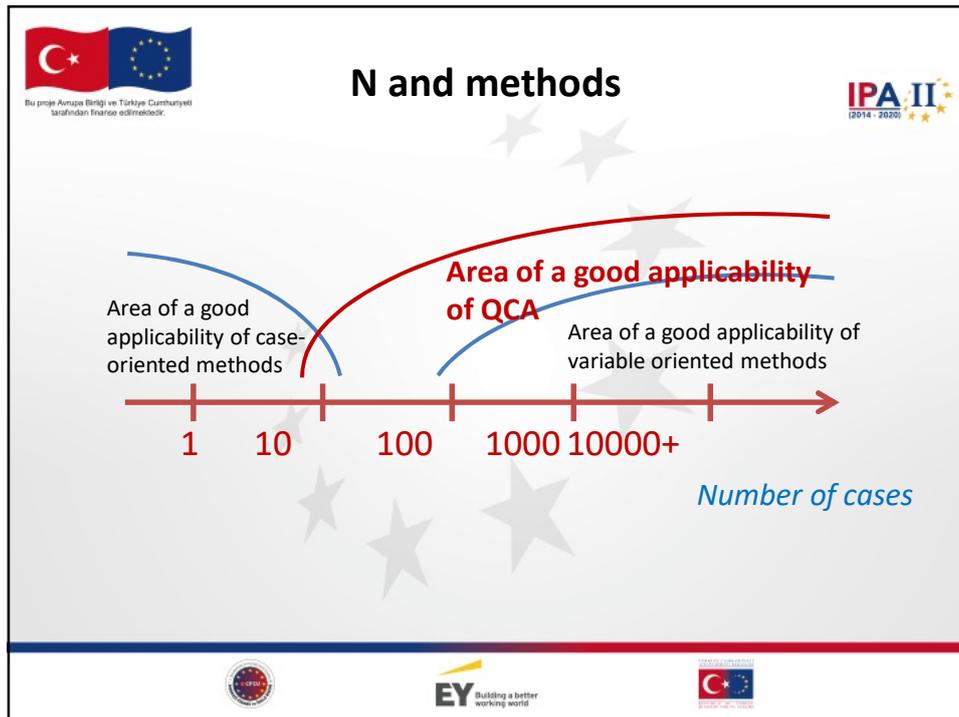
N and methods

Area of a good applicability of case-oriented methods

Area of a good applicability of QCA

Area of a good applicability of variable oriented methods

1   10   100   1000 10000+

Number of cases

QCA

Developed originally for comparative political science.

Tasks like comparison of EU countries:

- too few for statistical (variable oriented) methods;
- too many for comparative case studies.

Key Books on QCA
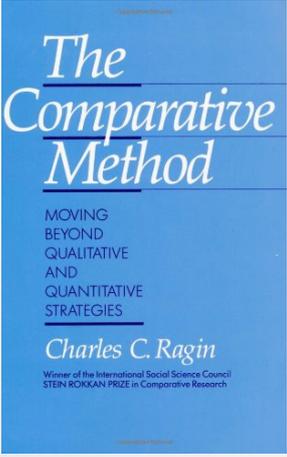
The Comparative Method

MOVING
BEYOND
QUALITATIVE
AND
QUANTITATIVE
STRATEGIES

Charles C. Ragin

Winner of the International Social Science Council
STEIN ROKKAN PRIZE in Comparative Research
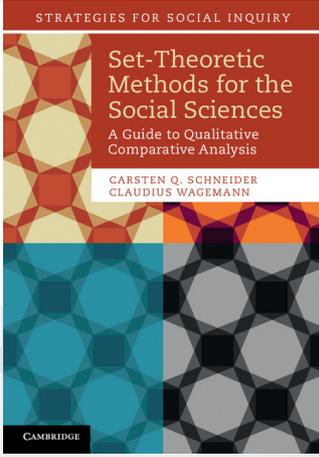
STRATEGIES FOR SOCIAL INQUIRY

Set-Theoretic
Methods for the
Social Sciences
A Guide to Qualitative
Comparative Analysis

CARSTEN Q. SCHNEIDER
CLAUDIUS WAGEMANN

CAMBRIDGE

Set-theoretic methods

QCA is a set-theoretic method.

Set-theoretic methods in general share three concepts, they:

- work with membership scores of cases in sets
- perceive relations between social phenomena as set relations
- interpret set relations in terms of sufficiency and necessity.

Membership scores of cases in sets

Set of European countries

- Is Czech Repubublic an European country?
- YES!
- Membership score for CZ is 1.

- Is Japan an European country?
- NO!
- Membership score for Japan is 0.

- Crisp sets – dichotomies (either in or out)

- What about Turkey?
- Is Turkey an European country?
- Partly! Membership score for Turkey could be 0.03 (based on area).
- Fuzzy sets – allows partial membership in a set (most social science concepts are not clearly dichotomous)

Relations between social phenomena as set relations

"All EU members are democracies."

- Set of democracies is a superset of the set of EU members.
- Set of EU members is a subset of set of democracies.

Interpret set relations in terms of sufficiency and necessity

Being a democracy is a necessary, but not sufficient condition of being an EU member.

Complex causality

Set theory serves well in unravelling complex patterns of causality as equifinality, conjunctural causation and asymmetry.

- Equifinality: alternative factors can produce the same results.
- Conjunctural causation: single conditions may not display an effect on their own, but only in combination.
- Asymmetry: explanation for the non-occurrence of the result cannot automatically be derived from the explanation for the occurrence of the result.
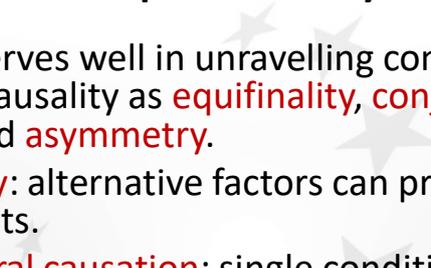
QCA as set-theoretic method

QCA is both research approach and data analysis technique.

QCA is set-theoretic method that aims at causal analysis and uses truth tables and logical minimalization procedures.

Variants of QCA

- Originally crisp-set QCA (csQCA).
- Nowadays is csQCA seen as a specific instance of fuzzy-set QCA (fsQCA).

Example

Study on university graduates: what factors influence the outcome „the graduate finds a job in the field of his/her study".

Factors studied:

- High school study results
- Motivation to study the particular field (first option)
- Practice during studies in faculty offered projects
- Competence after the graduation (self-reported)
- Post-gradual study (Ph.D.)
- Lack of barriers on the side of graduate
- Situation on the labour market

Example

Results:

Ph.D. (Prac*GoodLM + Prac*Motiv + ~Bar*Comp*Motiv) => Y

Ph.D. is necessary but not sufficient condition for the job in the field of study. It must be accompanied with one of following three combination of conditions:

- Practice AND good labour market situation
  OR
- Practice AND motivated
  OR
- Absence of barriers AND competence AND motivated
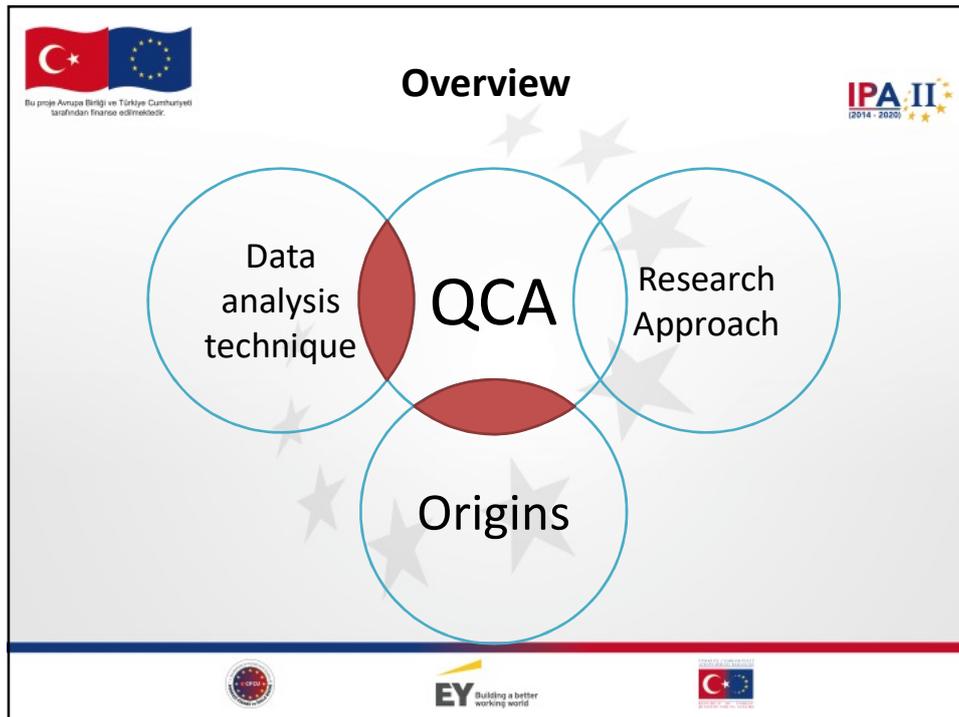
Overview

Data analysis technique — QCA — Research Approach — Origins

QCA as a "tool" – data analysis technique

QCA basics
- Sets
- Calibration of membership scores
- Operations in set theory
- Sufficiency and necessity
- Truth tables

QCA meets the Reality
- (In)consistency in the data
- (Limited) Coverage
- Limited diversity and logical remainders
- The Truth Table Algorithm

Crisp sets and fuzzy sets

- Original QCA, the crisp-set QCA faced criticism for the need of dichotomization of all cases' properties.

- However, most social science phenomena are not in binary form. People are not low-educated or high-educated, fat or slim, rich or poor. Any threshold would be arbitrary.

- This problem is solved when using fuzzy sets instead.

Fuzzy sets

- In fuzzy sets, the membership score is not dichotomous (0 or 1) but anywhere between 0 and 1. However, fuzziness is not based on lack of precision in empirical measurement. Fuzziness is due to not sharp conceptual boundaries.

- Fuzzy scales have three qualitative anchors:
  - Complete presence in the set (1)
  - Point of indifference (0.5)
  - Complete absence in the set (0)

- Verbal descriptions can be easily used for explanation of the scores:
  - 0.9 for "almost in"
  - 0.55 for "little bit more in than out"

Fuzzy set membership vs. probability

Fuzzy set membership does NOT represents probability of a case's membership in a set. The ambiguity is due to conceptual imprecision rather than measurement imprecision.

Do not kill yourself!

Exercise 5-10 - Pick your mug!

Which one do you prefer to drink?

A. Content of this mug has 0.01 membership score in the set of lethal poisons.

B. Content of this mug has 0.01 probability of being lethal poison.

Calibration

For use in QCA, data about cases have to be calibrated into fuzzy-set membership.

Calibration should not be purely automatic (like using statistical normalization of data into 0-1 interval), but should be based on conceptual and theoretical knowledge external to the data.

This still allows semi-automated procedures.

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Calibration - example

Practical experience during studies

Duration	Value in QCA
None	0.0
Less than 1 month	0.2
[point of indifference]	[0.5]
1-3 months	0.6
3-6 months	0.8
More than 6 months	1.0

Note that anything above 6 months has the same value.

Group work!

Task 5-E – Your data for QCA

Operations in set theory

Operator	Logic of propositions	Boolean algebra	Set theory
AND	Conjunction ∧	Multiplication *	Intersection ∩
OR	Disjunction ∨	Addition +	Union ∪
NOT	Complement ¬, ~	Negation 1-D	Negative set
Inclusion	If-then relation →, ⇒		Subset ⊂

Operations in set theory - example

Sets			AND (multiplication, intersection, conjuction)	OR (addition, union, disjunction)	Negation (complement)	
	D	F	D * F	D + F	~D	~F
Crips sets	1	1	1	1	0	0
	1	0	0	1	0	1
Fuzzy sets	0.8	0.3	0.3	0.8	0.2	0.7

EY Building a better working world

QCA solution term example

A*B + ~B*C + D*~F → Y

There are three ways how to get outcome Y.
First, presence of both conditions A and B.
Second, absence of B and presence of C.
Third, presence of D in combination of absence of F.
Condition E is irrelevant to the outcome.
(this demonstrates equifinality and conjuctural causation).

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Sufficiency and necessity

QCA, like other set-theoretic methods, interpret set relations in terms of sufficiency and necessity.

Sufficiency: $X \rightarrow Y$

A condition X is sufficient if, whenever it is present across cases, the outcome Y is also present in these cases. Presence of X guarantees Y.

If X, then Y   or X is a subset of Y.

In fuzzy sets, each case's fuzzy-set membership score in X must be equal to or smaller than its fuzzy-set membership in Y.

Necessity: $X \leftarrow Y$

A condition X is necassary if, whenever the outcome Y is present, the condition X is also present. Y cannot be achieved without X.

If Y, then X or Y is a subset of X.

If fuzzy sets, each case's fuzzy-set membership score in X must be equal to or greater than its fuzzy-set membership in Y.

Truth tables

- Truth tables are key tool in QCA.
- Single rows of the table represents logically possible configurations of conditions.
- Construction of a truth table
  - List all 2^k logically possible AND combinations of conditions.
  - Assign each case to particular truth table row
  - Define outcome value for each row.

Truth tables

Truth tables – Crisp set example

Row	Conditions			Outcome	Cases
	A	B	C	Y	
1	0	0	0	1	COL
2	0	0	1	1	PAR
3	0	1	0	1	CHI
4	0	1	1	1	BRZ
5	1	0	0	0	PER, ECU
6	1	0	1	1	URU
7	1	1	0	0	BOL
8	1	1	1	0	ARG, VEN

A = violent upheavals in the past

B = ethnically homogenous population

C = pluralistic party system

Y = stable democracies

QCA analysis

Row	Conditions			Outcome	Cases
	A	B	C	Y	
1	0	0	0	1	COL
2	0	0	1	1	PAR
3	0	1	0	1	CHI
4	0	1	1	1	BRZ
5	1	0	0	0	PER, ECU
6	1	0	1	1	URU
7	1	1	0	0	BOL
8	1	1	1	0	ARG, VEN

~A~B~C + ~A~BC + ~AB~C + ~ABC + A~BC → Y

A~B~C + AB~C + ABC → ~Y

Logical minimization

~A~B~C + ~A~BC + ~AB~C + ~ABC + A~BC → Y

A~B~C + AB~C + ABC → ~Y

[some Boolean algebra here]

~A + ~BC → Y

For stable democracy is sufficient either (1) absence of violent upheavals in the past or (2) ethnically non-homogenous population AND pluralistic party system.

A (B + ~C) → ~Y

For absence of stable democracy is sufficient violent upheavals in the past in combination with either ethnically homogenous population or absence of pluralistic party system.

QCA meets real data

Problem of contradictory truth table rows

Row	Conditions			Outcome		No. of Cases
	A	B	C	Y	~Y	
1	0	0	0	5	0	5
2	0	0	1	1	5	6
3	0	1	0	3	0	3
4	0	1	1	1	0	1
5	1	0	0	0	4	4
6	1	0	1	3	9	12
7	1	1	0	0	1	1
8	1	1	1	0	2	2

Contradictions

Problem of contradictory truth table rows:

- Go back to pre-QCA phase (to the data) and
  - Add a condition
  - Respecify the definition of the population of interest
  - Respecify the definition, conceptualization and/or measurement of the outcome or condition(s)
- This must be based on theoretical arguments

Contradictions

Problem of contradictory truth table rows:

- When not possible to re-do the pre-QCA phase:
  - Use „consistency threshold" (eg. 90 %)
  - Code all outcome values as 1 (investigating when outcome is possible)
  - Code all outcome values as 0 (investigating when outcome is certain)
  - Treat row as non-existing (logical remainder)

Consistency - visualization

Crisp sets:

1	A	B
0	C	D
	0	1
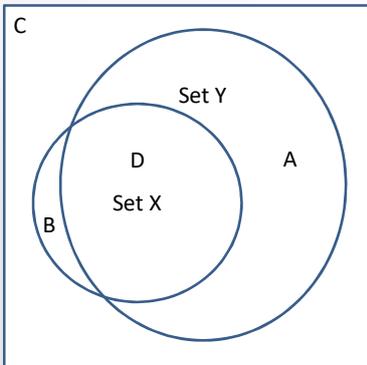
A – Outcome Y not explained by presence of condition X (lack of coverage)
B – Inconsistent cases
C – Irrelevant cases
D – Consistent cases

Visualization of consistency problems

Fuzzy sets:

Consistent Cases

Outcome Y

Inconsistent Cases

Trully logically contradictory case

Sufficient condition X
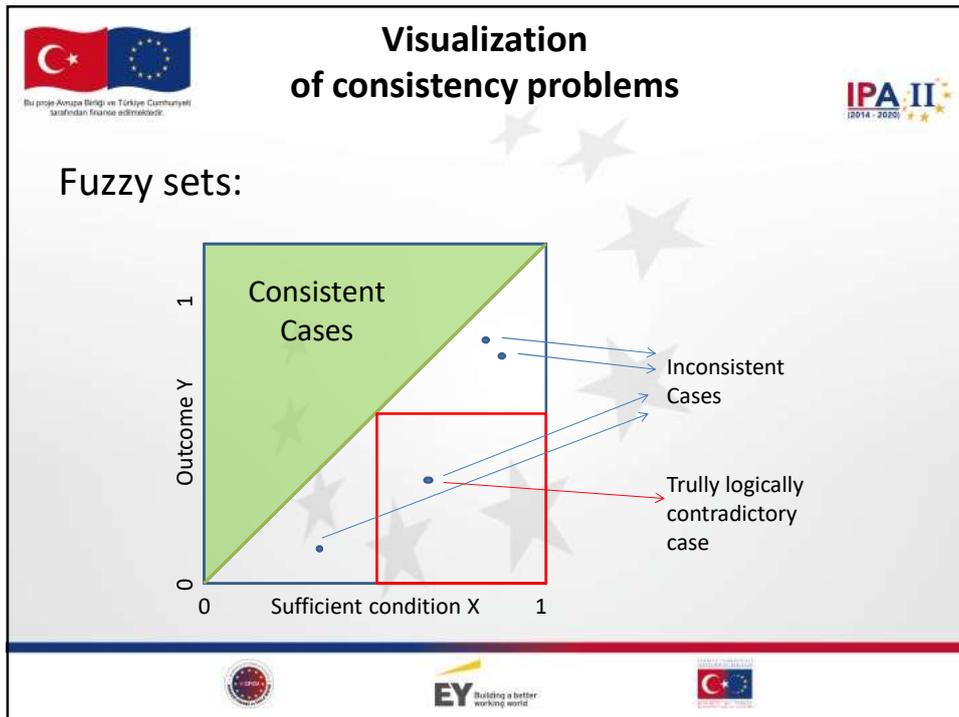
Parameters of consistency and coverage

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How much of the membership in the outcome is covered by membership in single path

How much of the outcome is covered by only this single path

```
                raw          unique
             coverage     coverage     consistency
            ----------   ----------   ----------
t*d*p        0.439024     0.012195     0.800000
d*p*m        0.634146     0.055488     0.866667
b*d*k2*m     0.552439     0.048781     0.899702
solution coverage: 0.695122
solution consistency: 0.793319
```

Degree to which the empirical data fit a perfect subset relation (lower than 0.75 is usually considered to be a problem)

How much of the outcome is covered by the entire solution term

QCA meets the real data

Problem of limited diversity
(lack of empirical evidence)

Row	Conditions			Outcome		No. of Cases
	A	B	C	Y	~Y	
1	0	0	0	5	0	5
2	0	0	1	0	0	0
3	0	1	0	3	0	3
4	0	1	1	1	0	1
5	1	0	0	0	4	4
6	1	0	1	0	0	0
7	1	1	0	0	1	1
8	1	1	1	0	2	2

Logical remainders

- Logical remainders are truth table rows without enough cases.

- There are three general causes of this situation:

  - Arithmetic remainders

    - Example: there are 28 EU members. In case of analysis of 5 conditions, there are $2^5 = 32$ combinations of conditions. Thus, purely mathematically, not all combinations of conditions can be observed in 28 countries.

Logical remainders

IPA II
(2014 - 2020)

— Impossible remainders
- Investigation of job-related discrimination. Conditions analysed include sex (M), age (O) and pregnancy (P). It makes sense to research possible discrimination of pregnant women in comparison to other groups. In this situation no observations will be in categories MOP or M~OP as existence of pregnant man is impossible.

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Logical remainders

IPA II
(2014 - 2020)

— Clustered remainders
- Reality is structured by historical, social, cultural and other processes. As a results, some combinations of conditions could be theoretically possible, but unlikely in reality.
- The same investigation of job-related discrimination. Presence of a case of pregnant women aged 55+ would be extremely rare.
- Note, there is no clear dichotomy between impossible and clustered remainders, it is rather a continuum.

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Dealing with logical remainders

What to do with rows 2 and 6? Should they be included in the logical minimization of outcome Y, of outcome ~Y, of both, or of neither?

Row	Conditions			Outcome		No. of Cases
	A	B	C	Y	~Y	
1	0	0	0	5	0	5
2	0	0	1	0	0	0
3	0	1	0	3	0	3
4	0	1	1	1	0	1
5	1	0	0	0	4	4
6	1	0	1	0	0	0
7	1	1	0	0	1	1
8	1	1	1	0	2	2

Dealing with logical remainders

What to do with rows 2 and 6? Should they be included in the logical minimization of outcome Y, of outcome ~Y, of both, or of neither?

We need assumptions and depending on these assumptions, different solution term can yield from the same truth table. However, no solution will contradict empirical evidence.

Software

For using QCA as Data analysis technique, tailor made software is available:

- fsQCA 2.5 (http://www.u.arizona.edu/~cragin/fsQCA/software.shtml)
- Tosmana (http://homepage.uni-trier.de/cronqvis/tosmana-tool-for-small-n-analysis/)
- Plug-ins for Stata or R

Overview

Data analysis technique

QCA

Research Approach

Origins
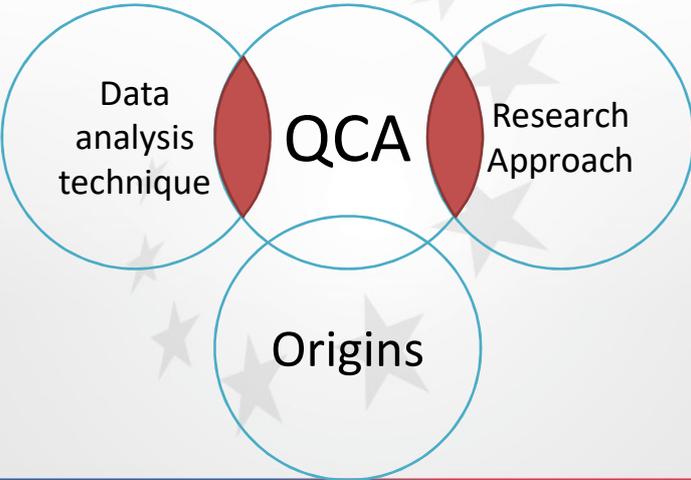
Good QCA

1. Is QCA an appropriate approach?
   - Complex causality, interest in necessary and sufficient conditions
   - To sumarize data in truth table
   - To test hypotheses and theories
   - To develop new theoretical arguments
   - Creating empirical typologies

Good QCA

2. Conditions and the outcome
   - Moderate number
3. Choice of QCA variant
   - csQCA, fsQCA, tQCA?
4. Calibration of set-membership scores
5. Analysis of necessary conditions
   - Consistency thershold should be higher here than in case of sufficiency
6. Analysis of sufficient conditions

The Truth Table Algorithm

Overview of the process of data analysis:

1. Data matrix to be coverted into a truth table
2. Decide for each truth table row if it is consistent for the outcome, not consistent or logical reminder
3. Logical minimalization (standard analysis)

The outcome and non-occurrence of the outcome should be analyzed separately

Procedure differs for analysis of sufficient and necessary conditions.

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```
***********************
*TRUTH TABLE ANALYSIS*
***********************

File:  C:/Users/Jirina/Desktop/kalibrovana_data_pro FQCA_zaklad_test_souboru.csv
Model: ~v oboru = f(t, b, d, k2, p, m)

 Rows:      92



 Algorithm: Quine-McCluskey
      True: 1
   0 Matrix: 0L
Don't Care: -

--- INTERMEDIATE SOLUTION ---
frequency cutoff: 1.000000
consistency cutoff: 0.894569
Assumptions:
~t (absent)
~b (absent)
~d (absent)
~k2 (absent)
~p (absent)
~m (absent)

                raw         unique
              coverage    coverage   consistency
             ----------   ----------  ----------
~d            0.753623    0.676087    0.832000
~t*~b*~k2*~m  0.143116    0.065580    1.000000
solution coverage: 0.819203
solution consistency: 0.843342
```

Good QCA

7. Presentation of results

 – Which conditions account for the outcome

 – Which cases are (not) accounted for by which part of the solution

 – How well does the solution fit the empirical evidence

 – (solution terms, tables, Venn diangrams, XY plots)

Good QCA

8. Interpretation of results

9. Reiteration of the research cycle

Frequent pitfalls

- When holding a hammer, everything looks like a nail.
- Mechanistic application – running the script without theoretical insights.
- Lack of reiteration

QCA and theory testing

QCA allows for investigation how theory fits the empirical evidence by creating intersections of T (theory) and E (empirical) sets:

- TE is part of theory supported by empirical evidence
- ~TE are cases not expected by theory
- T~E are cases where theory wrongly predicts presence of the outcome
- ~T~E are cases where neither theory nor empirical evidence indicates outcome

This can be used (depending on coverage and consistency parameters) as „Straw in the wind" „Hoop" „Smoking gun" or „Double decisive tests"

Remember?

Bayesian deductive inference-1

Low certainty /disconfirmatory power

Low uniqueness (confirmatory power)

High uniqueness (confirmatory power)

Straw in the Wind tests

E.g. murder suspect was known to have a temper

Weakest test: do little to update our confidence in h(ypothesis)
Regardless whether we find e(vidence) or not (=-e)

Smoking gun tests

E.g. murder suspect was seen wiping red liquid off a candle holder

If (e) (then greater confidence in h (high uniqueness as e highly unlikely unless h) and highly improbable rivals. If we find –e, the test is useless to update our confidence.

Hoop tests

E.g. Murder suspect was in town in the week of the murder

E.g. suspect was in proximity of the murder location around the time of the murder

If (-e) = was not in town, reduces our confidence in H, if (e) = was in town, does little. Hoops: sit on a continuum where tighter hoop means if (e), it is NOT useless but has some confirmatory power!

Doubly decisive tests

E.g. CCTV filmed the crime.

If (-e)(suspect on camera) then (–h), if (e) then all other rival theories ruled out.

Very rarely possible!

...ch and Pedersen   *High certainty /disconfirmatory power*   129

QCA as a part of multi-method research (links to process tracing)

Schneider and Rohlfing 2013

Case selection for process tracing

QCA can help you to select the most appropriate cases for cross-case analysis.

- Process tracing in typical cases for analysis of causal mechanisms
- Process tracing in deviant cases for improvement of theory

QCA XY plot for case types
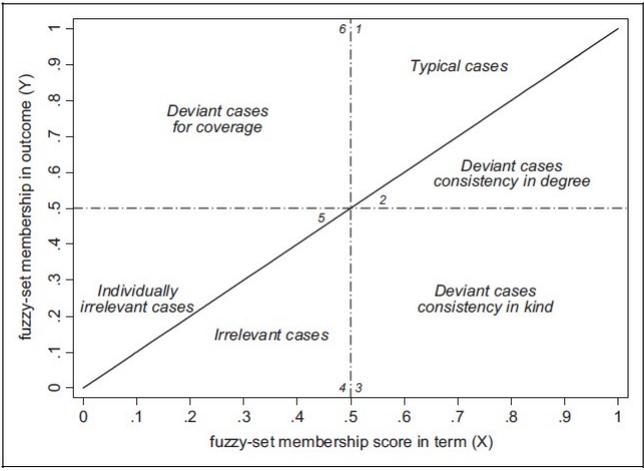
Case selection example
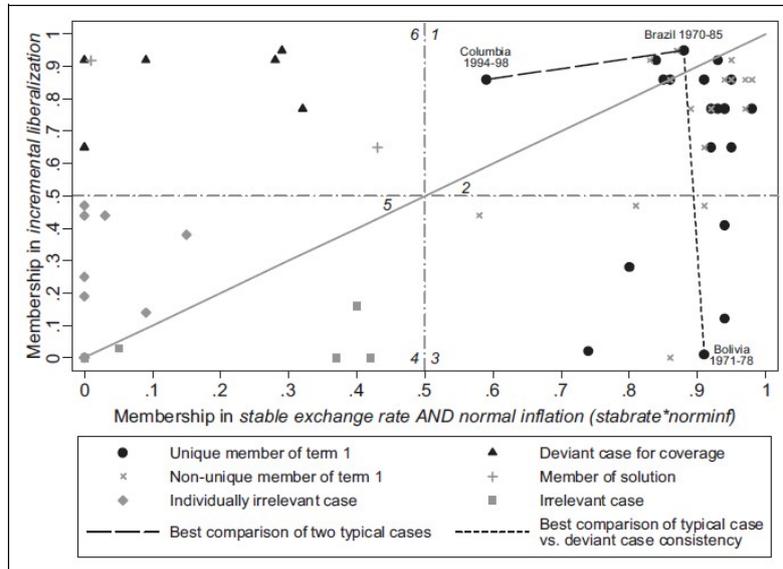
A case study

- Qualitative comparative analysis in combination with Process tracing
- http://prezi.com/kaoyr0jwavmz/?utm_campaign=share&utm_medium=copy

Reflection so far (3/4)

Exercise 5-11 – Reflection of Module 5
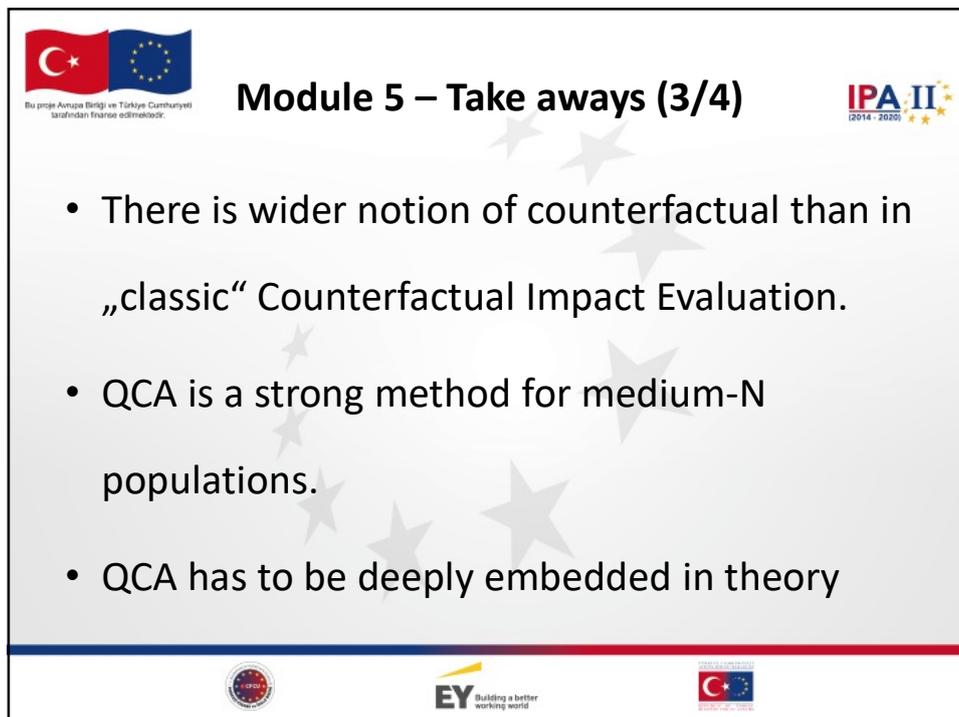
Module 5 – Take aways (3/4)

- There is wider notion of counterfactual than in „classic" Counterfactual Impact Evaluation.

- QCA is a strong method for medium-N populations.

- QCA has to be deeply embedded in theory

Module 5 –

Evaluation Designs and Methods

Methods 4 / 4
Process evaluation, Systems thinking, Vanguard method

Process vs. Impact evaluation

Exercise 5-12 – What is the difference?

- What is the difference between the impact evaluation and process evaluation?
- Think about its purpose, time, object of study, designs and methods.
- Discuss within a group and be ready for plenary discusson.

Try to think about frequent „process evaluation" as about impact evaluation of your technical assistance priority axis.

Intervention = your system of work
Results = how well you do it

Process evaluation

- Example of Systems Thinking / Vanguard method

Based on B. Wauters

Brainstorming

**Are there alternative ways
in how the (public) organisations
are managed?**

What are these?

Agency level "outputs" as the focus for efficiency?

The standard input-activity-output factory model as depicted by OECD, 2009*
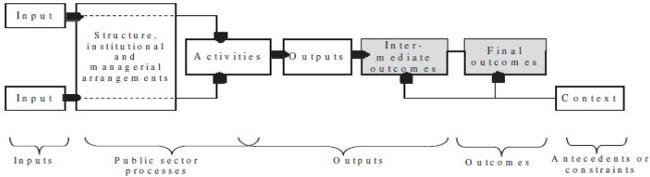
Source: Based on Van Dooren *et al.* (2006), Hatry (1999), Boyne and Law (2004), Pollitt and Bouckaert (2004), and Algemene Rekenkamer (2006).

*Measuring government activity

Management manages inventories, scheduling, planning, reporting, sets budgets, targets,…

All of this concerns information that is abstracted from work. Decisions are equally removed from the work. Most managers do not really (need to) understand the work. It is a management factory.

Workers are just cogs in the machine. They are treated as the least important with planners, inspectors, etc. all held in higher esteem than them.
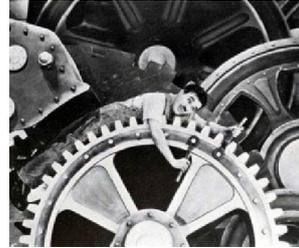
This worked! Henry Ford's black Model T: halved cost of production, while still doubling worker's wages!

BUT… newly hired workers lasted an average of… 3 months!

In addition, it is a push system: make then sell

These kinds of systems tend to run high inventories, especially when more than one model has to be produced (to meet variety in demand) as it is production efficiency that drives them, NOT actual demand.

Clearing the inventory needs to be done frequently by special sales efforts (push).

A focus on production/ activity costs means losing sight of inventory and management costs (full end to end cost).

In addition, employees, especially in information based work like services, do not necessarily leave when pressured but they cheat and game the system. Responses to that (coaching, auditing, inspection) again increase management costs.

Where are the factories?

The public service is predominantly about… services!

Why services (including public) differ?

- There is **much higher** variability of demand *(every person in different).*
- As demands on services are very variable
    - It is difficult to set meaningful standards, guidelines are very detailed, but stil insufficient to cope with everything possible
    - It is difficult to quantify the quality of human interaction
- Service is always co-produced in interaction between the client and provider in given time. To stock of services available.

OK, nothing is perfect… but there is no other way, right?…

Or is there?

E. Deming

William Edwards Deming was an American statistician, professor, author, lecturer and consultant. He is perhaps best known for the "Plan-Do-Check-Act" cycle popularly named after him. In Japan, from 1950 onwards, he taught top management how to improve design (and thus service), product quality, testing, and sales (the last through global markets) through various methods, including the application of statistical methods. Deming made a significant contribution to Japan's later reputation for innovative high-quality products and its economic power. He is regarded as having had more impact upon Japanese manufacturing and business than any other individual not of Japanese heritage.

T. Ohno is considered to be the father of the Toyota Production System, which later became Lean Manufacturing in the U.S.

T. Ohno

Redefining "efficiency"!

Reduce cost relative to activity and output with "acceptable" standards, defects, inventories and narrow range of products/ services

Reduce waste across the entire system, handling abundant variety; continuously improving standards, reducing inventory, defects…

Command and control thinking		Systems thinking
Top-down, hierarchy	**Perspective**	Outside-in, system
Functional	**Design**	Demand, value and flow
Separated from work	**Decision-making**	Integrated with work
Output, targets, standards: related to budget	**Measurement**	Capability, variation: related to purpose
Contractual	**Attitude to customers**	What matters?
Contractual	**Attitude to suppliers**	Co-operative
Manage people and budgets	**Role of management**	Act on the system
Control	**Ethos**	Learning
Reactive, projects	**Change**	Adaptive, integral
Extrinsic	**Motivation**	Intrinsic

Systems thinking

- Circle of Vanguard Method

Check phase = process evaluation

CHECK

DO PLAN
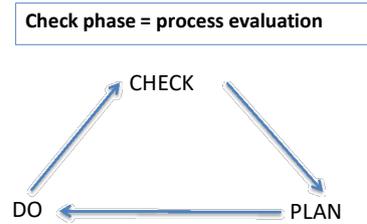
Break-fix service systems

Customer demand ⟶ Understand demand

⟶

Respond (resolve) ⟵ Determine resolution

This step can entail:
- Straightforward categorising of the issue, then appropriate solution is clear
- For more complicated issues, expert analysis may be required before the right (set of) solution(s) becomes clear

*Based on Snowden, 2007
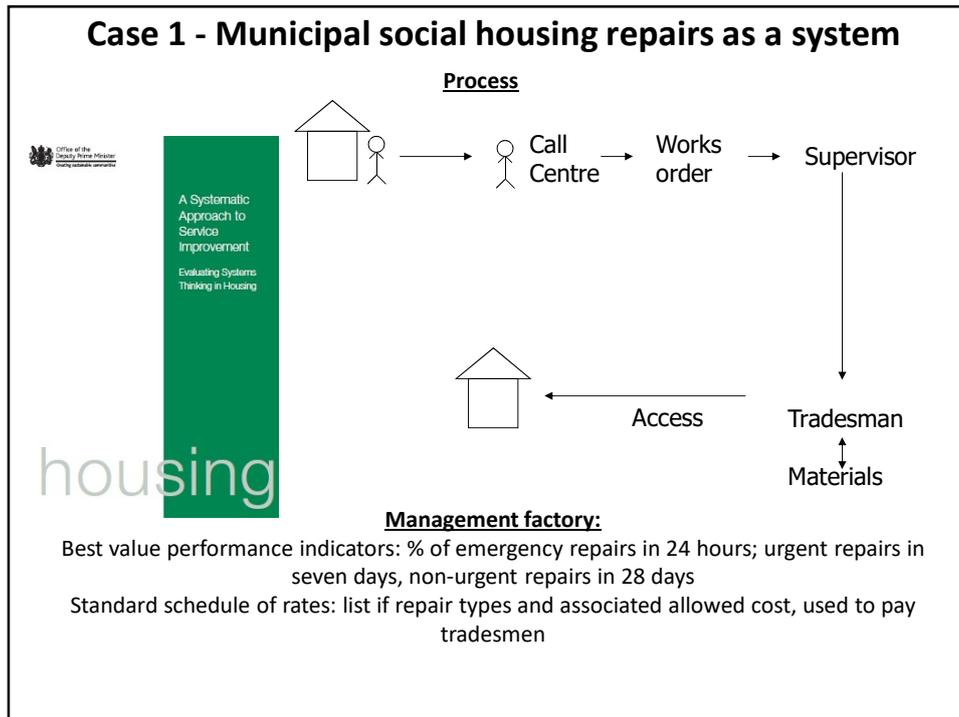
Case 1 - Municipal social housing repairs as a system

Process

A Systematic
Approach to
Service
Improvement

Evaluating Systems
Thinking in Housing

housing

Call Centre → Works order → Supervisor

Access ← Tradesman

Tradesman ↕ Materials

Management factory:

Best value performance indicators: % of emergency repairs in 24 hours; urgent repairs in seven days, non-urgent repairs in 28 days

Standard schedule of rates: list if repair types and associated allowed cost, used to pay tradesmen

---

- Anyone in EU funds familiar with any of these?
  - X% of payment requests treated in X days
    - pause button if request not complete
  - Standard minimal workload of X projects per year
  - X days to pay after request treated
  - X weeks time to appraise a proposal
  - Etc...

Toyota Production System for services: Vanguard method

① What is the purpose (in customer terms)?

⑥ Thinking

⑤ System Conditions

④ Flow : Value work + Waste

③ Capability of response

② Demand : Type + Frequency
What matters?

C
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John Seddon is an occupational psychologist, researcher, professor, management thinker and leading global authority on change, specialising in the service industry. He has published five books. In his 2008 book, Systems Thinking in the Public Sector, he provided a criticism of the UK Government reform programme and advocated its replacement by systems thinking. Seddon won the first Management Innovation Prize for 'Reinventing Leadership' in October 2010. He conceived the Vanguard method.

Toyota Production System for services: Vanguard method
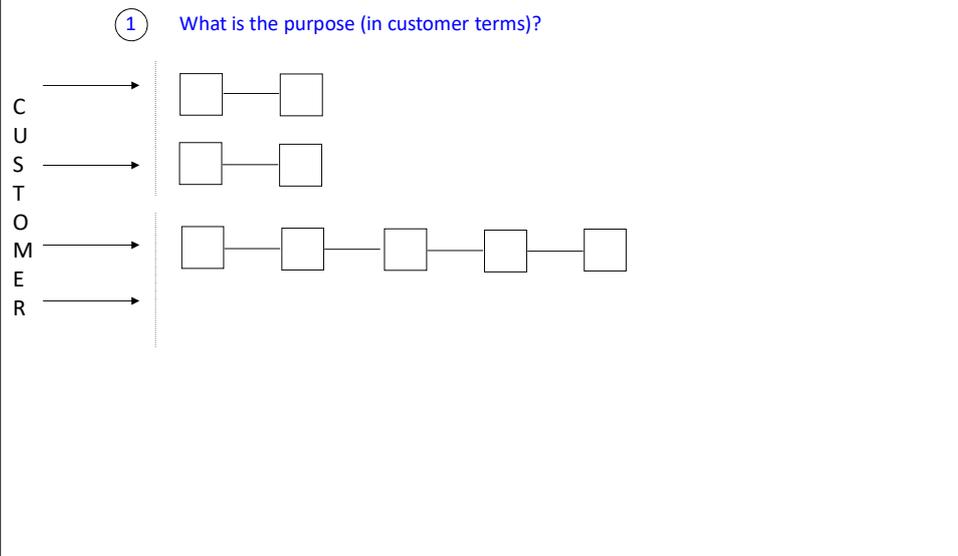
① What is the purpose (in customer terms)?

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1. What is the purpose?

- From the customer's point of view:
  - Repair properly and quickly

Toyota Production System for services: Vanguard method

① What is the purpose (in customer terms)?

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② Demand : Type + Frequency
What matters?

2. Value and failure demand

- **Failure demand** = caused by a failure of an organisation to do something for the customer or to do it properly
- **Value demand** = not failure demand, demand that is present in perfect system

2. Demand: type and frequency

- Demand = the customer hitting the system with a request
  - 60% was value demand: tenants requesting a (diversity of) repair(s) for the first time
    - Type and frequency relatively predictable by geography
  - 40% of calls to the call centre were failure demands
    - Tenants progress chasing their repair
    - Tenants complaining repair was not satisfactory
    - Tenants progress chasing their complaint
  - Call centre had to locate tradesmen or supervisor to find out what was happening, which took time
    - This time was not available to respond to valued demand hence creating waiting times

44

2. Demand type and frequency

- Organisations may have various transaction points with customers e.g. a cable TV operator may
  - Send a marketing pack
  - Send a sales man
  - Install cable
  - Transmit TV programmes
  - Send invoices
  - Provide customer service
- For any of these transaction points, the client will make demands:
  - We need to know what type and how frequent for all of them
  - We need to know what matters for the client for all of them
- Sometimes the label is not "demand" but "contact"
  - E.g. police need to understand what kinds of crime and disorder appear in what frequency
- Organisations should handle predictable demand at the point of contact (if low frequency by pulling expertise)

Toyota Production System for services: Vanguard method
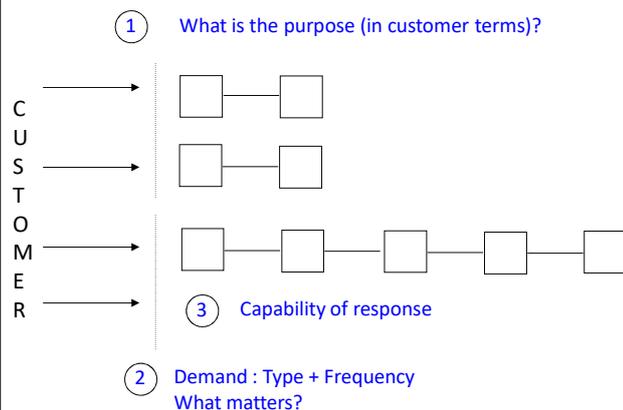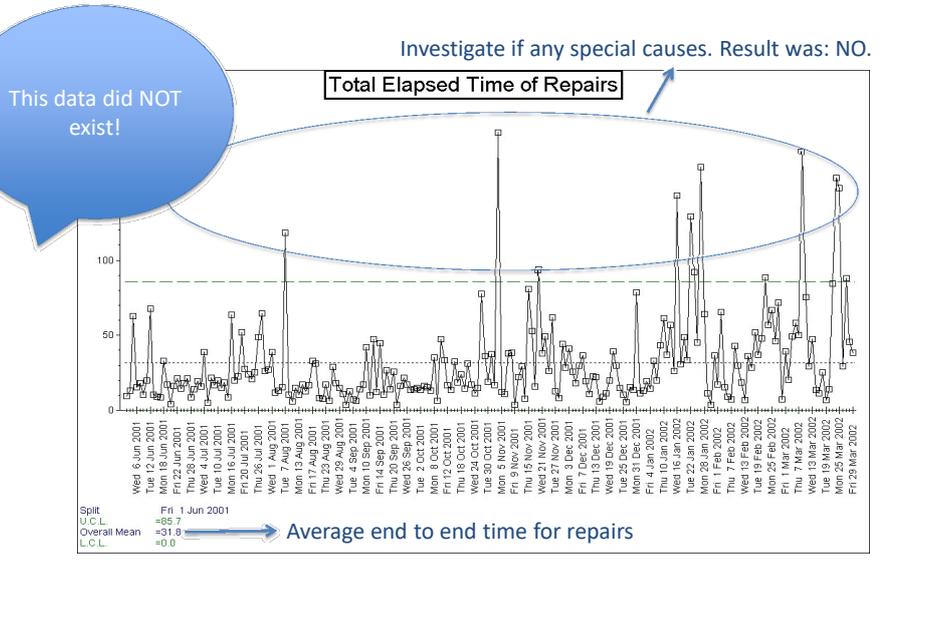
① What is the purpose (in customer terms)?

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③ Capability of response

② Demand : Type + Frequency
What matters?

3. Capability of response
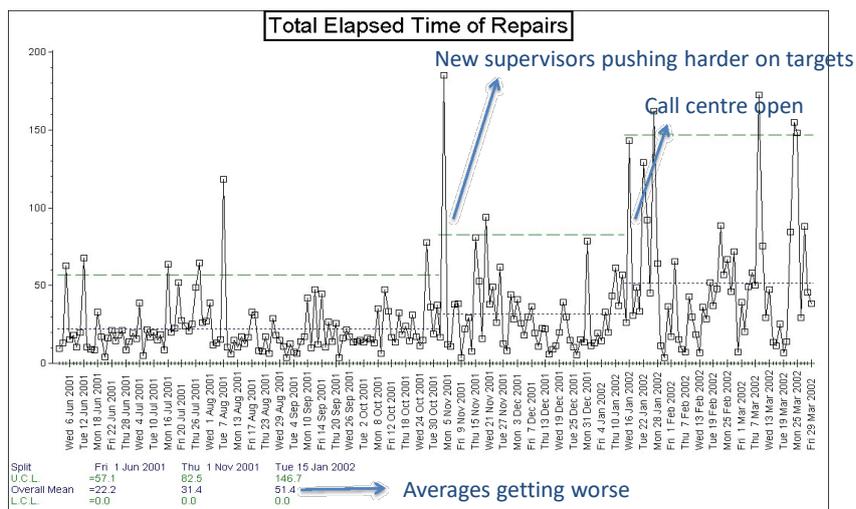
- Performance measures actually looked OK!
- But how?
  - Jobs closed (even though never completed) and reopened
    - Sometimes with justification e.g. if tenants are out, we cannot do the job, so this job should not count
  - Job classifications changed to meet deadlines
    - Emergency became urgent etc.
  - What was one job for the tenant was several ones for the system
    - Repair a window= 1) glazing 2) carpentry 3) plastering 4) painting with glazing and carpentry urgent but plastering and painting not…

Toyota Production System for services: Vanguard method

1   What is the purpose (in customer terms)?

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4   Flow : Value work + Waste

3   Capability of response

2   Demand : Type + Frequency
What matters?
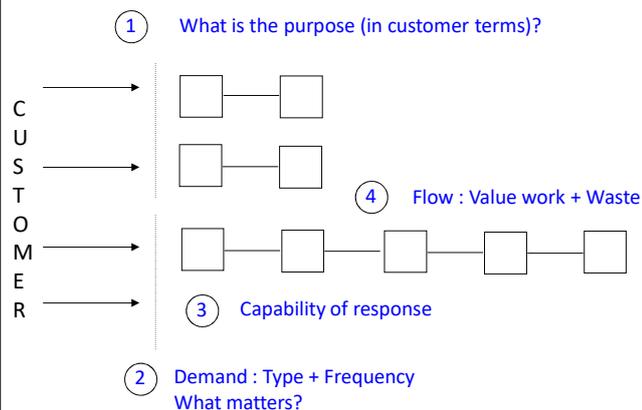
4. Flow: value work and waste
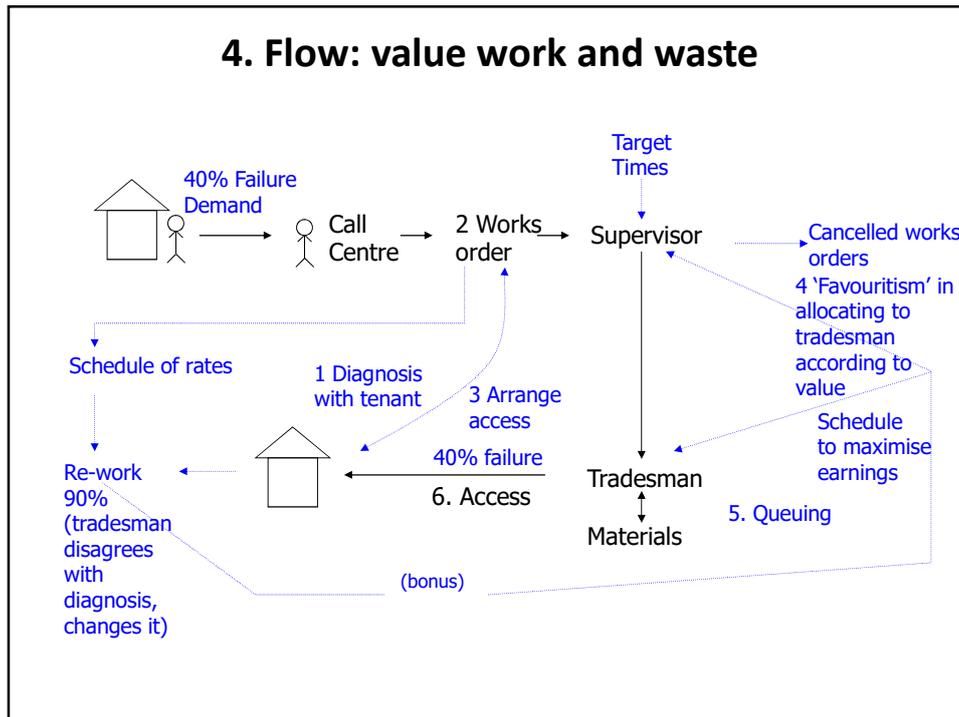
Waste = activity that does not help tenants:

– Queuing each day to get allocated materials

– Arriving at home when tenants absent:

  • Call centre needs to reschedule, worker needs to revisit

– Arriving at home without proper materials as job was misspecified

  • Call centre + tenant cannot know what the job really entails (90 % misspecification)

  • Administrators had to collect returned work order to pass to manager to check if respecifying was justified

  • Call centre needs to reschedule, worker needs to revisit

– Jobs material allocated according to schedule of rates, not what was really required (usually less)

– Call centre staff, supervisors, workers dealing with complaints of poorly done jobs

Value work:

- Diagnose
- Access
- Repair

Toyota Production System for services: Vanguard method

(1) What is the purpose (in customer terms)?

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(5) System Conditions

(4) Flow : Value work + Waste

(3) Capability of response

(2) Demand : Type + Frequency
What matters?
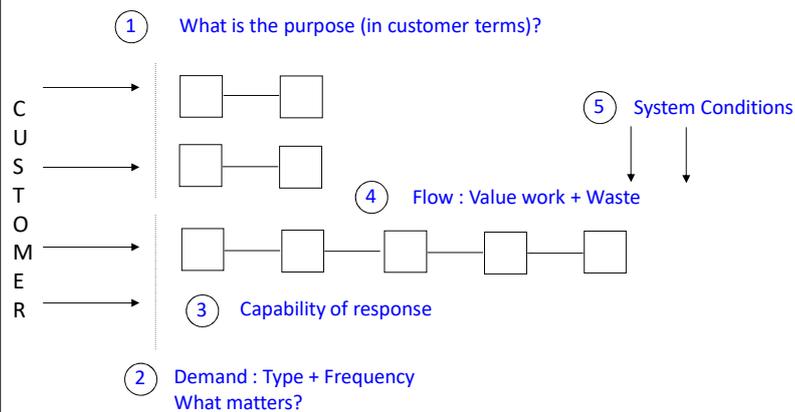
5. System conditions

- Structure (incl. roles and authority), targets, process design, procedures (incl. for managing absenteeism, appraisal of staff, inspection), incentives, IT…

- Redesign the system to remove causes of failure demand to absorb the variety of value demand with expertise!
  - As demand predictable by geography tradesmen were in zones
    - Call centre patches through demand to nearby tradesmen who arranges visit, goes there, diagnoses and, if possible, fixes immediately (single piece flow: finish job before starting something else)
    - If not possible agree future date
  - As material requirements predictable by predictable type of work, tradesmen carry suitable stock
    - no more queing
    - increased probability of being able to do repairs when coming for diagnosis
  - Tradesmen elected not to be paid per job but with fixed salary

Results
NEXT EXIT ↗

Within weeks, end to end time plummeted to MAXIMUM of eight days

Tradesmen morale skyrocketed

What to be careful about in service provisio **For info**

- Dumbing people down with procedures
  - Scripts, computer driven diagnostics screens…
- Locate the expertise that can statisfy the client BEHIND the first point of contact in back offices
  - If the demand is rare, you should still have an expert in the common demand able to assess that the more specific expertise is required and then "pull" it to increase their competence
  - This represents on the job learning
- Measure (and set targets for) how many "pieces" of work people do and manage for this, using procedures, standards, measures to control behaviour as they will all become the de facto purposes rather than satisfy client demand
- Try to prioritise "important" customers
- *Increase functional specialisation
- Use IT to replace people or to digitalise the current way of working:
  - Turn service requests into work packages to be moved around electronically
  - Just digitalises waste if system not redesigned first
- Outsource to lower cost organisations / countries (outsource waste)

*Why aren't we all working for learning organisations? E-organisations and people May 2010. vol 17, n2, Seddon et al

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What to be careful about in service provision? **For info**

- Dumbing people down with pr…
  - Scripts, computer…
- Locate the exp… …int of contact in back office…
  - If the… …able to ass… …e their co…
  - Th…

Anything that can reduce the capacity to absorb variety is to be carefully scrutinised because it leads to increases in variance and loss of control in end to end performance

- Measu… …anage for this,… …ey will all become t…
- Try to prioriti…
- *Increase function…
- Use IT to replace people… …way of working:
  - Turn service requests into… …ges to be moved around electronically
  - Just digitalises waste if syste… not redesigned first
- Outsource to lower cost organisations / countries (outsource waste)

*Why aren't we all working for learning organisations? E-organisations and people May 2010. vol 17, n2, Seddon et al

What to avoid in service provision? **For info**

- Use "quality management" as a tick-box exercise:
  - ISO:
    - Set standard
    - Inspect against it
    - Allocate blame if not met
  - EFQM / CAF
    - Set criteria
    - Rate yourself against criteria
    - Compare with others (benchmark)
  - In both cases it can divert attention to actually study how the work gets done and how much it delivers for the customer
  - Plaques and flags can become the de facto purposes
  - At e.g. Toyota quality is part of the work, not something to be ensured separately

What to avoid in service provision? **For info**

- Use "quality management" as a tick-box exercise:

But NEVER take away existing practice without substituting it with something else! Otherwise performance could collapse!

Tools can deliver performance improvement but there is no subsitute for studying the work

- an_____rs for th____
- Pla____ and flags can become t___
- At e.g. Toyota quality is part of the ____ separately

"95% of variation in workers' performance is governed by the system"

Command and control thinkers work on the 5% (people), system thinkers on the 95%!
Errors will be stable and predictable unless the system is changed!

The problem is NOT motivation or competence.

If the system is properly designed and workers trained for predictable high frequency demand, they will be motivated, be their own inspectors and do the best possible job.

But to design the system properly, managers need to think differently…

W. Edwards Deming

Toyota Production System for services: Vanguard method

① What is the purpose (in customer terms)?   ⑥ Thinking

C U S T O M E R

⑤ System Conditions

④ Flow : Value work + Waste

③ Capability of response

② Demand : Type + Frequency
What matters?

6. Thinking

1. Leader's Assumptions/ Expectations

2. Leader's Behaviour

3. Organizational Environment

4. Employees' Behaviour
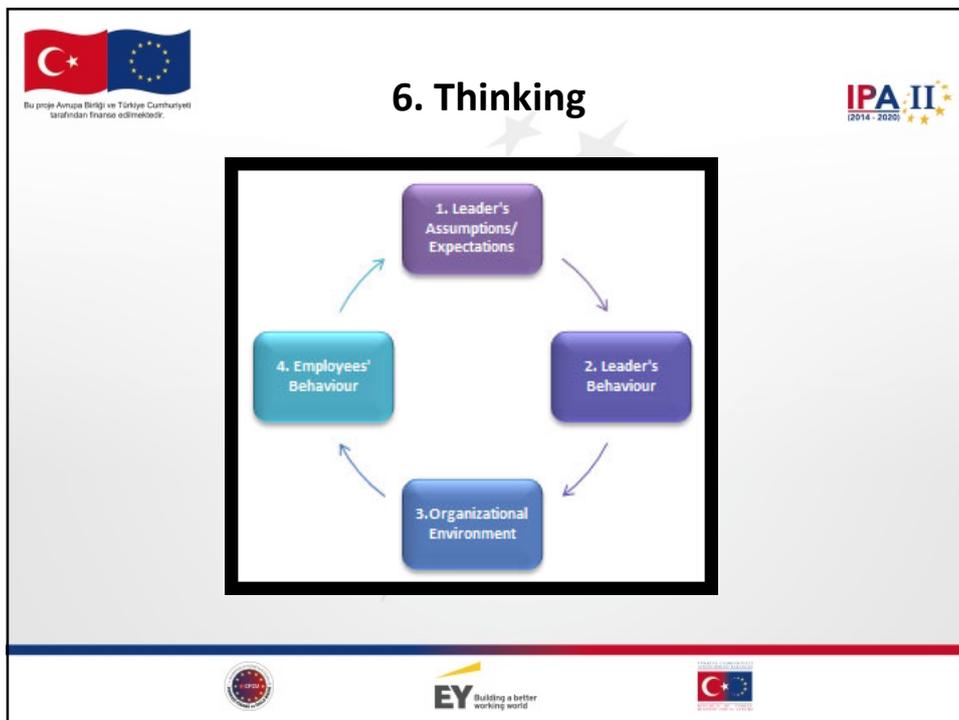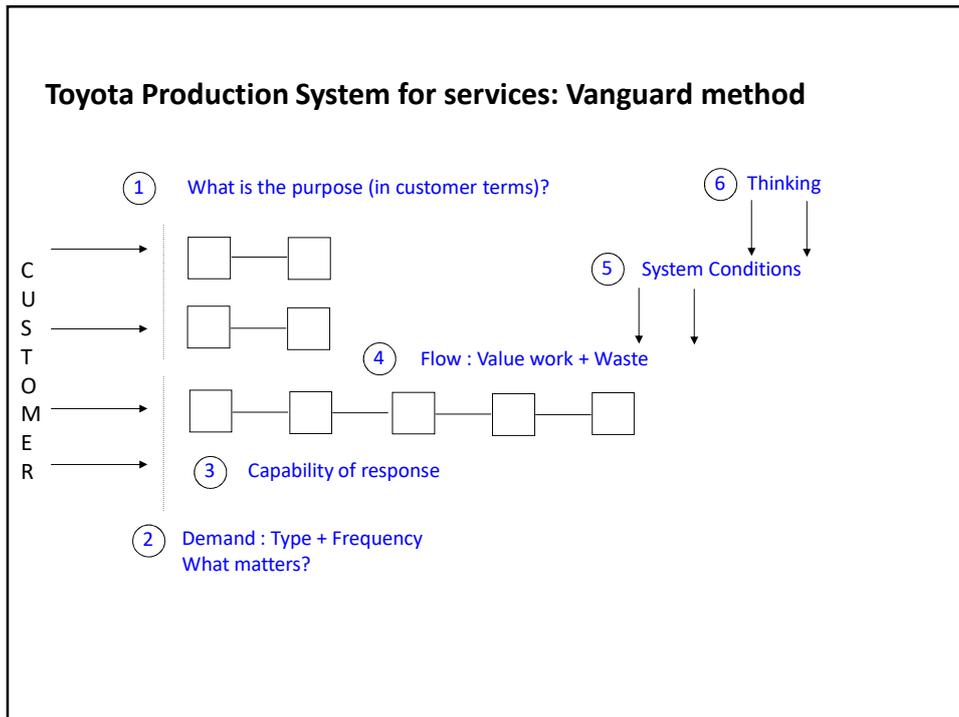
6. Thinking

- Systems thinking is changing the role of managers
- Their role should be in focus and thinking about the system as a whole, not measurement and control of particularities.
- Change in thinking is necessary to change the system

6. Thinking

- In housing case, these management assumptions were changed:
  - Performance-based salaries (more activities => more money) will maximalize the performance.
  - One cannot trust to tradesmen, thus standardized amount of materials has to be allocated to them.

Conclusion

The Vanguard method is a good starting place to re-establish trust between management and line workers…

…because managers get to understand performance is not a people problem and workers see that management changes its thinking …

Where in service provision we can think (categorise, analyse) and then act (solve)…

.. maybe we should try to think out of the box?

Innovation Department

…we need to act ourselves into new ways of thinking first (by conducting check) when redesigning a system, engaging in innovating…
(action learning, learning by doing, experimentation…)

…or we will just do more of the same, within our current set of assumptions.

p.15 Systems thinking, lean production and action learning
In Action learning vol 4, april 2007. Seddon et al.

Other cases around

For info

Click to **LOOK INSIDE!**

DELIVERING PUBLIC SERVICES THAT WORK
VOLUME ONE
Edited by Peter Middleton
Foreword by John Seddon

SYSTEMS THINKING IN THE PUBLIC SECTOR: CASE STUDIES
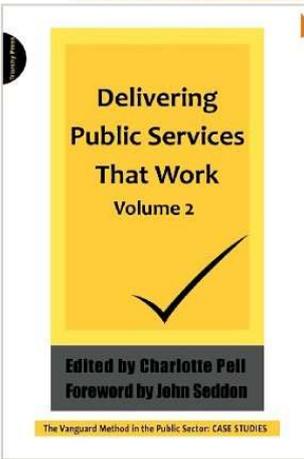
Delivering Public Services That Work
Volume 2

Edited by Charlotte Pell
Foreword by John Seddon

The Vanguard Method in the Public Sector: CASE STUDIES

Workshop

System thinking process evaluation

Systems thinking workshop I

IPA II
(2014 - 2020)

Exercise 5-13 – Step 0 – Your customer

- Who is your customer?
  - in public services customer doesn't usually directly pay for the service
  - BUT she/he derives value from provided service

EY Building a better working world

Step 0 – Customer

IPA II
(2014 - 2020)

- Social housing repair system example
  - Tenants
    - they don't pay for repairs but still they were customers
    - end to end – call for repair to satisfied tenant

EY Building a better working world

Systems thinking workshop II

Exercise 5-14 – Step 1 – Purpose

- What is the purpose of your work from the point of view of your customer?
- What does the „perfect service" from their point of view look like?
- Where do you meet customers in your work? (What are the transaction points?)

Where do you meet customers in your OP?

Who of you is involved in following:

- Project appraisal and selection?
- Control of monitoring reports and payment claims disbursement?
- Other demands from your project applicants/promotors?

Who is not involved in any primary processes?

Step 2 – DEMAND

① What is the purpose (in customer terms)?

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② **Demand : Type + Frequency**
What matters?

Systems thinking workshop III

Exercise 5-15 – Step 2 – Demand

- Write on post-its at least three concrete cases of your last contact with your customers, when they had a demand on you. Try to use exactly their words.
- Think about each demand – is it value demand or failure demand? (Would it come in a perfect system?)
- Sort it into three group – Value demand, Failure demand, I don't know
- Discuss „I don't knows" within your group and try to sort them.
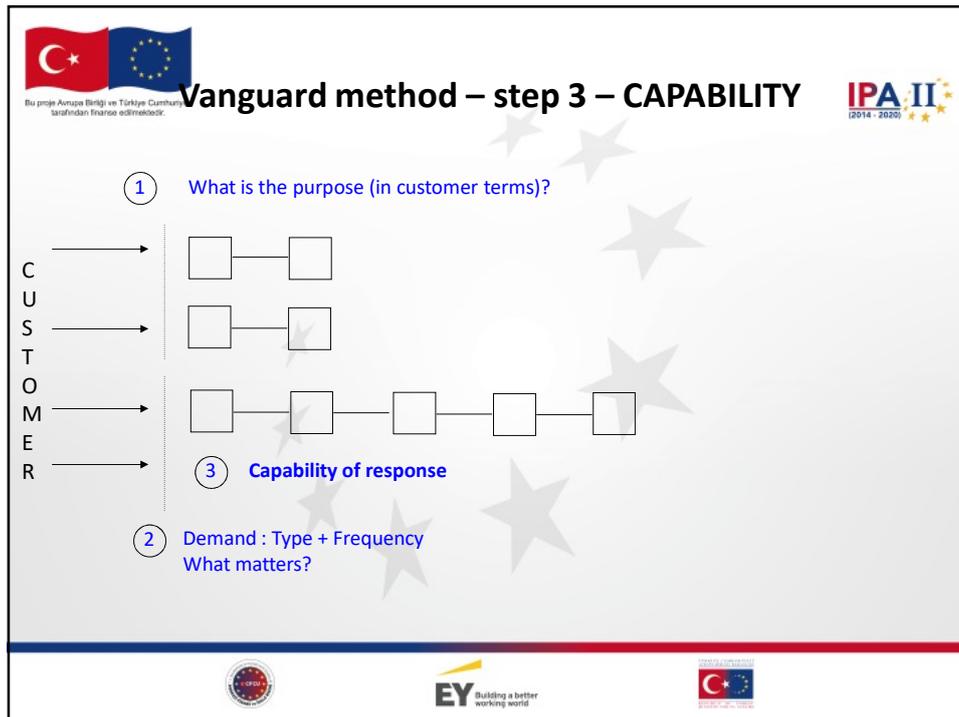
Vanguard method – step 3 – CAPABILITY

① What is the purpose (in customer terms)?

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③ **Capability of response**

② Demand : Type + Frequency
What matters?

Step 3 – CAPABILITY

In case of your transaction point:

- Do you measure end-to-end time? From the first contact to the succesful end of the case (from the customers' point of view)?
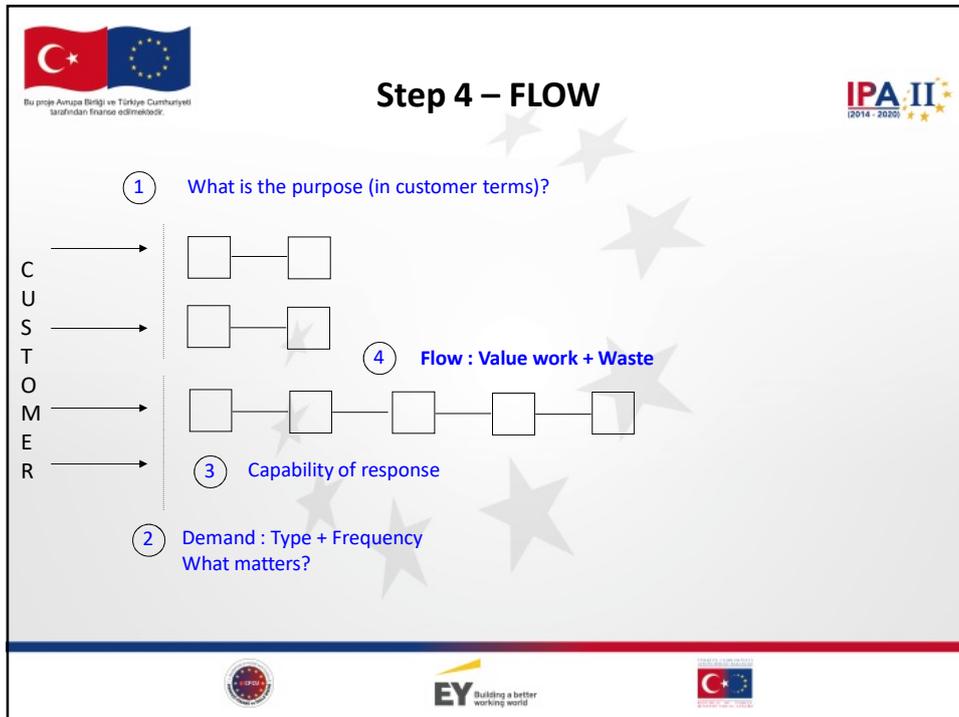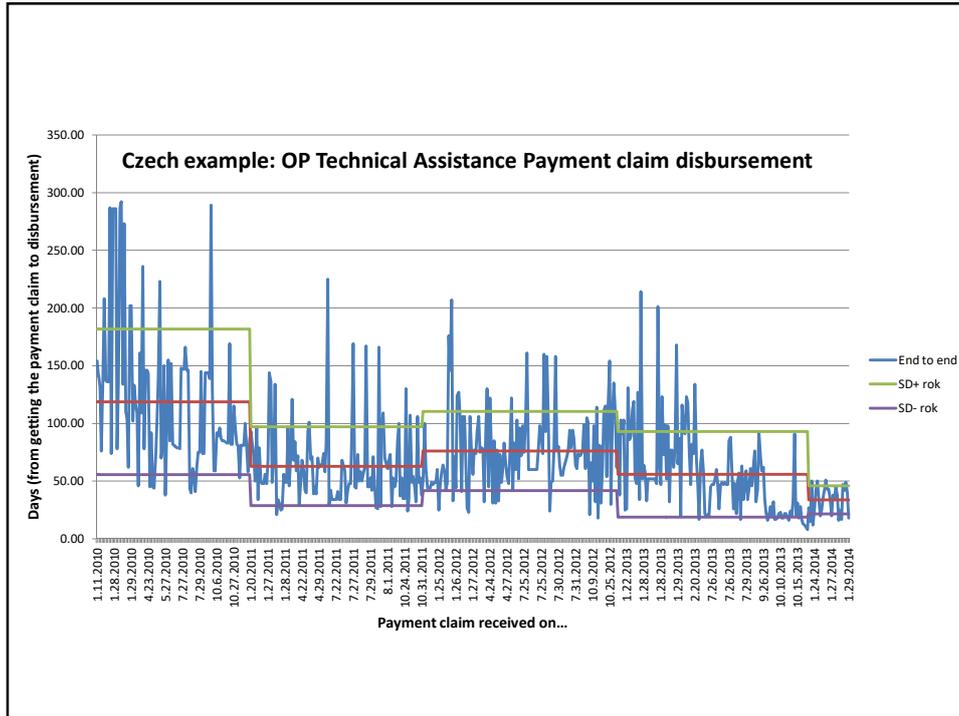
Czech example: OP Technical Assistance Payment claim disbursement

Step 4 – FLOW

1. What is the purpose (in customer terms)?

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4. **Flow : Value work + Waste**

3. Capability of response

2. Demand : Type + Frequency
What matters?

Systems thinking workshop IV

Exercise 5-16 – Step 4 – Value work vs. Waste

Could you give any examples of „waste" in your work?

System thinking for EU funds:

MINISTRY OF REGIONAL DEVELOPMENT

National Coordination Authority

Systems Thinking for European Structural and Investment Funds management:

Guidebook to process evaluation and a way to the lean fund management

Version: Second English Edition, draft
Date: May 22, 2017

A case study

- System thinking „Vanguard method – check"
- OP Technical assistance, CZ
- http://prezi.com/ohlkll-3dbh0/?utm_campaign=share&utm_medium=copy&rc=ex0share

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The Big picture of the system in the current OP TA

Top boxes (blue):
- Defendable decisions are more important than good decisions.
- All the projects are the same.
- No interaction between managing authority and the project. Just documents!
- Danger of concentration of power!
- They don't read the manuals and guidelines!
- The most important thing is the speed of spending!

Second row boxes:
- Check-list culture and lack of expertise.
- Twisted PCM for all!
- Informal consultations to speed up the formal flow. But is it OK?
- „Ballance of power" between MA, IB and the budget dept. Waste time in negotiations.
- Let's make manuals more precise!
- Faster handling payment requests, but this in our case not important to our client, it's just accountancy.

Transaction points / Project promotor:
- Project application
- Project change announcement
- Monitoring report
- Payment request
- Public procurement ex-ante check
- On the spot control

Callout boxes:
- Up to 29 e-mail exchanges in informal consultation of one payment request.
- 14 % of project change announcements to announce what everybody can read in newspapers.
- Project has to be in contact with at least 5 different units.
- Formal letters between directors of Managing authority and Budget department
- Project descriptions as vague as possible.
- The most frequent question: How much will you spend in the next quarter?
- No-one sees the big picture of an project.
- 4+ hand-overs to confirm what you already know.
- 50 % failure demand in project application.

Defendable decisions are more important than good decisions.

All the projects are the same.

No interaction between managing authority and the project. Just documents!

Danger of concentration of power!

They don't read the manuals and guidelines!

The most important thing is the speed of spending!

Check-list culture and lack of expertise.

Twisted PCM for all!

Informal consultations to speed up the formal flow. But is it OK?

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The most frequent question: How much will you spend in the next quarter?

No-one sees the big picture of an project.

4+ hand-overs to confirm what you already know.

50 % failure demand in project application.

Exercise for reflection (4/4)

Exercise 5-17 – Reflection of Module 5

Module 5 – Take aways 4/4

- System thinking is powerful tool for diagnosis of your organization.

- Unfortunately, without personal involvement of the manager, change rarely follows.

- You cannot delegate that you have learn to swim.