Coding Guide

A Multiple Case Study of Operations Control Centers in ITSM

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1 Introduction

Data analysis consists of examining, categorizing, tabulating, testing quantitative and qualitative evidence to address the propositions (Yin, 2003). With this aim, we apply open coding and axial coding techniques (Corbin & Strauss, 2008) supported by the coding software tool MAXQDA. In order to mitigate potential bias, the interviews will be encoded in an iterative dual coding approach as follows: First, all transcripts will be encoded independently by two coders based on a codebook that explained the codes and how they should be applied. Hence, information that is linked to our conceptual foundation and potential new constructs can be identified. Second, always after 3-4 dual encoded transcripts the mismatches will be discussed by the authors. Minor deviations, such as differences in the range of the coded segment, can be corrected without consulting the other coder. If inter-coder reliability is below 85%, the coding guidelines will be adjusted and the affected transcripts will be encoded again. Additionally the weight feature of MAXQDA will be used to indicate the relative strength of a code.

2 Coding Procedure

The coding of the transcribed interviews is done by the authors of the study and an independent coder. The coding will be done in iterations and after each phase an alignment between the coders

and potential rework of the codebook is required in order to a achieve an intercoder reliability of at least 80% – similar to the procedure visualized in Figure 1.

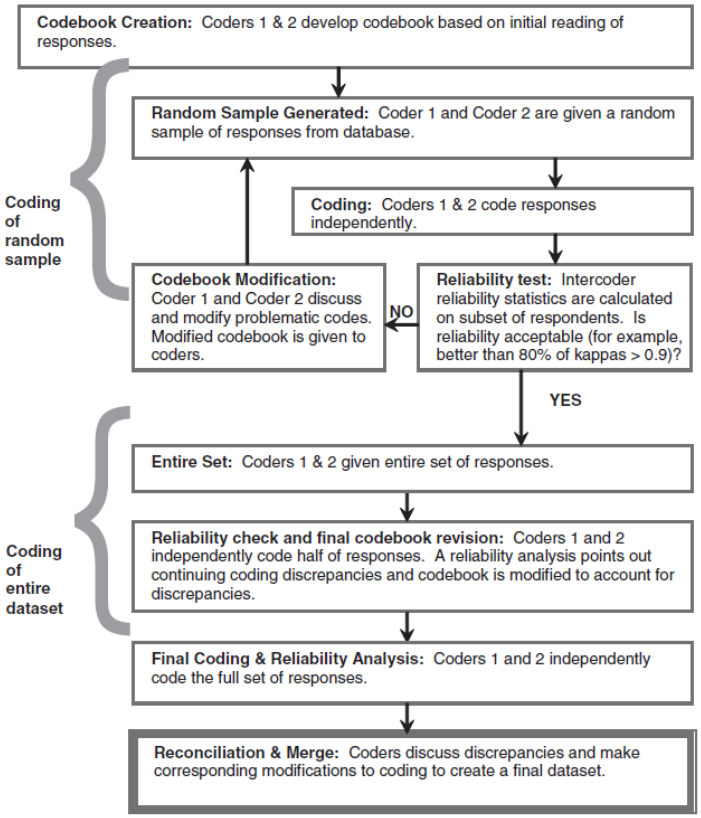


Figure 1: Coding Procedure[1]

3 Coding Tool

The tool MAXQDA is used. A 30 day free demo version can be downloaded from http://www.maxqda.de/demo.

The tool offers also a feature to compute intercoder agreement values: http://www.maxqda.de/videos/intercoder-vergleich#vid

The MAXQDA data file (including coding system and interview transcripts) will be shared via dropbox (www.dropbox.com).

[1] Source: http://www.bwgriffin.com/gsu/courses/edur9131/content/ReliabilityCodingQualitativeData-Hruschka.pdf

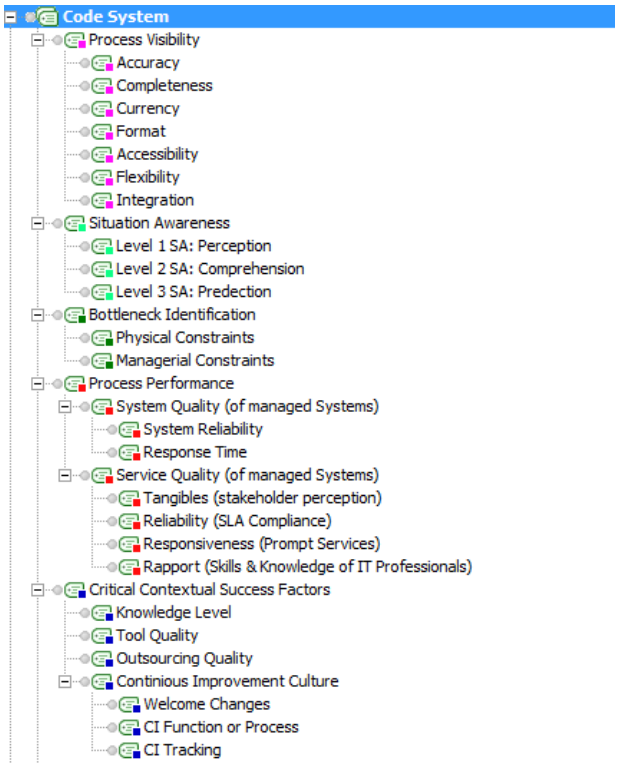


Figure 2: Code System in MAXDA

4 Codebook

4.1 Category "Process Visibility"

Code	Definition (based on Berner et al. 2012; Nelson et al. 2005)	Example Quotes	Comment
Accuracy	The degree to which process information is correct, unambiguous, meaningful, consistent, and trustable (perceived to be valid, reliable and objective and a positive attitude is embraced towards the source)	"I think there was a change in quality of information – quantity of information and the accuracy".	
Completeness	The degree to which all possible process states and other information relevant for the process participants are represented.	"I think there is more available than what we currently have". Or is this accessibility?	Coding is focused on OCC. So, if there are e.g. statements about incompleteness we code them with "completeness" even if the info might be available in other systems. If some systems are not integrated, then it should be coded as integration. Completeness vs. Accessibility: If parts of information is available, then it is about "completeness". If information is completely missing, then it is accessibility.
Currency	The degree to which process information is up-to-date, or the degree to which the information precisely reflects the current state of a process instance.	"There are scenarios where we get alerts too late".	
Format	The degree to which process information is presented in a manner that is useful, readily useable, analytically interpreted, and contextualized (centered on process steps and is set into relation with previous and adjacent process steps).	"Some of the information on alerts has to be created from manual interventions".	Information overload problems are also "format" issues
Accessibility	The degree to which process information can be accessed by the process participants with relatively low effort.	"Information was available before OCC, but nowhere nearly accessible as it is now".	
Flexibility	The degree to which process information analysis and representation can adapt to a variety of process participants needs and to changing conditions.	"But it should be a little bit more flexible regarding colors to add some things more custom-made"	
Integration	The degree to which process information is available for the entire process by facilitating the combination of information from various sources to support decisions.	"Monitoring and control of over 200 systems with minimum amount of daily work effort is achieved with OCC". "The vendor worked in one direction based on the information they had and we worked in another direction based on the information we had".	

4.2 Category "Situation Awareness"

Code	Definition (Endsley, 1995)	Example Quotes	Comment
Level 1 SA (Perception)	The degree to which an operator perceives the status, attributes, and dynamic of relevant elements in the environment.	"We now finally know what is going on, what had pinged on the systems…To be honest, there is a higher awareness".	
Level 2 SA (Comprehension)	The degree to which an operator is able to understand the significance of elements in the environment in the light of his/her goals based on his/her level 1 perception.	"You know the traditional back-man diagnosis, but with the advent of the dashboard, we have information on the performance, availability, database issues and what not. When you receive an alert, we can investigate instantly to make sure that it is a real alert based on standard operating procedures".	
Level 3 SA (Projection)	The degree to which an operator is able to project the (near) future based on his/her level 2 comprehension.	"In the last half quarter the benefit came back to us where we actually -- before the system went down, catch the issue… We are extremely pleased because these are proactive actions, not reactive".	

4.3 Category "Bottleneck Identification"

Code	Definition (based on Goldratt & Cox 1992)	Example Quotes	Comment
Physical Constraint Identification	The degree to which physical constraints such as materials, machines, people and demand that limit a process from achieving higher performance versus its goal are recognized.	"We were able to identify some capacity issues. And we were able to identify some configuration issues".	
Managerial Constraint Identification	The degree to which managerial constraints in the form of policies, procedures, rules and methods that limit a process from achieving higher performance versus its goal are recognized.	"Our team is really working with the guided procedures, so … it's getting better, yes, every time…"	If it is about identifying impediments in guided procedures, then we code it with "managerial constraint identification" – and not with "CI culture"

4.4 Category "Process Performance"

Sub-Category	Code	Definition	Example Quotes	Comment
System Quality of managed systems	Reliability (of managed systems)	The degree to which a system is dependable (e.g., technically available) over time (Nelson et al., 2005).	"The last major incident in production environment was 12 months ago. So the systems have been very stable".	
	Response time (of managed systems)	The degree to which a system offers quick (or timely) responses to requests for information or action (Nelson et al., 2005).	"I would say I don't have a metric that proves or disproves whether the response times increased, but like I said, because we're alerting before a user creates a ticket to send it in, to let know about it, I would say that it improves the overall response time."	
Service Quality	Tangibles	Physical facilities, equipment, and appearance of personnel (Pitt, Watson, & Kavan, 1995).	"I think the perception [by stakeholders] is getting better".	
	Service Reliability	Ability to perform the promised service dependably and accurately (Pitt et al., 1995).	"We were able to identify some issues that our service provider chose to ignore or postpone earlier".	
	Responsiveness	Willingness to help customers and provide prompt service (Pitt et al., 1995).	"We might not have known for hours, sometimes even days we had middleware issues until our customers complained. And of course, they can complain very loudly."	
	Rapport	Ability to convey a rapport of knowledgeable, caring, and courteous support (Kettinger & Lee, 2005)[2]	"We at least typically have some idea of what the issue is before we get the first user complaint".	

[2] The original SERVQUAL dimensions *assurance* and *empathy* (Pitt et al., 1995) are merged into the dimension *rapport* because they have a lot of similarities in the IS context (Kettinger & Lee, 2005).

4.5 Category "Critical Contextual Success Factors"

Code		Definition	Example Quotes	Comment
Skills and Knowledge		The degree of acquired cognitive or metacognitive competency that develops with training and/or practice (McCombs & Marzano, 1990).	"Before OCC the monitoring was done by senior analysts. This was a humongous waste of resources… It is part of our cost savings by getting these rally junior level resources with just basic SAP knowledge from a two weeks training".	
Continuous Improvement Culture	Welcome Changes	The degree to which in an organization a culture exists that welcomes changes for improvement.		
	CI Function or Process	The degree to which in an organization formal functions and processes are established to support CI	"But now, the next step will be to prevent them. Do some root cause analysis and problem management. For this, you need people. The way we are working makes it impossible to get people's time"	
	CI Tracking	The degree to which in an organization CI results are tracked		
Tool Quality		The quality of the monitoring tool in use.	"One main issue is the overall OCC stability. Some of these issues are related to our personal setup of not having a quality test environment." "There are already lots of things that we can only use now, and, yes, and it's a pity that we didn't have those earlier."	In our cases the tool is "SAP Solution Manager – Operations Control Center" (More Details: see section Background). Deficiencies in tool quality can also come from implementation or configuration of the tool.
Outsourcing Quality		The degree to which an outsourcing relation is managed well.	"It was quite a challenge because our service provider did not have a motivation to change. They did not want to use the new processes and tools to support our business."	

4.6 Weightage of Code Segments

Code segments get weight scores (1-5 Likert scale) based on the degree of improvement or worsening situation. A weight score of 1 means there was drastic worsening of the situation as a result of the OCC implementation, a weight score of 5 represented complete satisfaction of the phenomenon, and a weight score of 3 meant there was no impact as a result of the implementation.

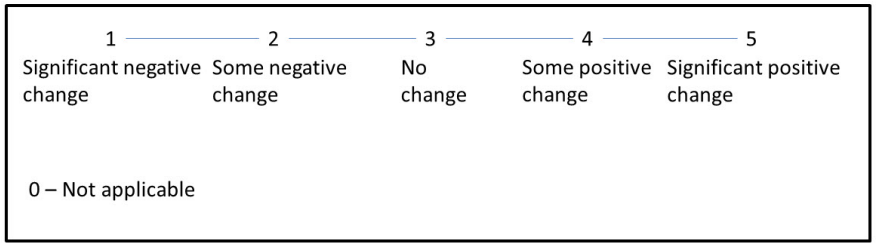


Figure 3: Weightage for Code Segments

For “Contextual Success Factors” an analogue weightage is used:

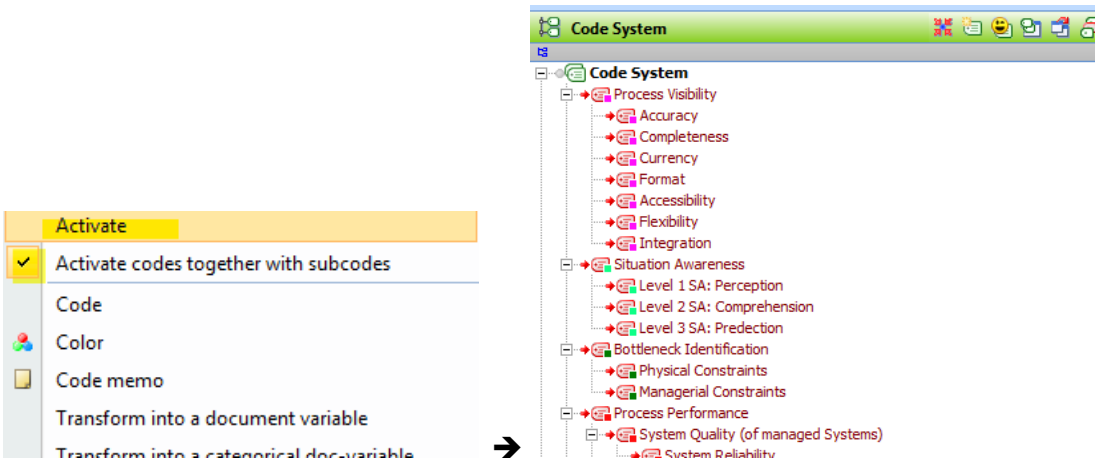
3 = low, 4=medium, 5=high

5 Inter-Coder Reliability

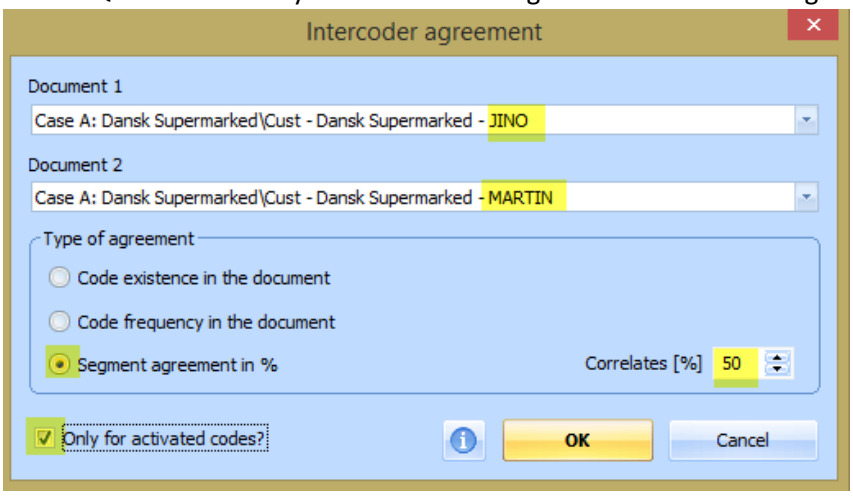
MAXQDA offers a functionality to compute Inter-Coder Reliability between 2 documents.

Procedure:

1. Activate used codes (from above Codebook) with context menu on the code:



2. In MAXQDA menu “Analysis → Intercoder Agreement” the following selection is used:

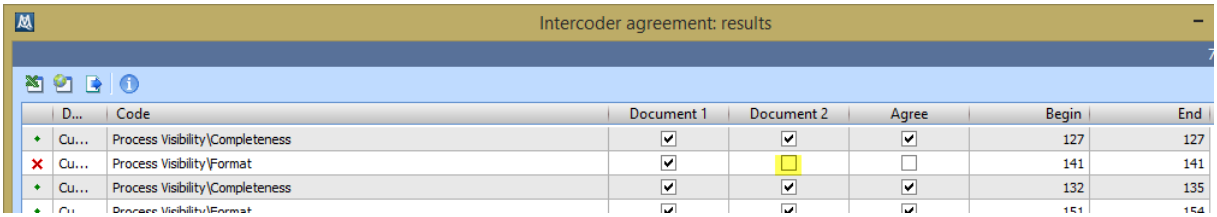


3. As a result you get 2 reports:

   a) Inter-Coder Reliability per code and in total

Process Performance\Service Quality (of managed Syst...	0	1	1	0,00
Process Performance\Service Quality (of managed Syst...	2	1	3	66,00
Process Performance\Service Quality (of managed Syst...	0	2	2	0,00
Critical Contextual Success Factors	0	0	0	0,00
Critical Contextual Success Factors\Skills and Knowledge	6	0	6	100,00
Critical Contextual Success Factors\Tool Quality	2	0	2	100,00
Critical Contextual Success Factors\Outsourcing Quality	0	1	1	0,00
Critical Contextual Success Factors\Continuous Improve...	0	0	0	0,00
Critical Contextual Success Factors\Continuous Improve...	0	1	1	0,00
Critical Contextual Success Factors\Continuous Improve...	6	0	6	100,00
Critical Contextual Success Factors\Continuous Improve...	0	0	0	0,00
<Total>	44	27	71	61,00

b) Agreement status of all coded text passages



If you e.g. double-click on the marked field above, you directly jump in document 2 (Martin's document) to the text passage coded in document 1 (Jino's document) with "Format" – but not in document 2.

6 Background

The following information and terminology is helpful to understand the transcript:

"Where close monitoring and management of critical situations is required, control centers play a key role. The most common and prominent control centers are the control centers used to manage airspace in aviation (Clarke, 1998). A further example of Operations Control Center (OCC) can be seen in the energy sector where control centers must be in place to ensure security and have grown with the changes in IT over the years (Clarke, 1998; Dy-Liacco, 2002).

In line with these industries, the quest to operate the IT landscape for a company to ensure that business can function without disruptions has always been there. The OCC that is being analyzed here is a quest in this regard to understand how far the IT industry has come to quench this demand. SAP SE is Europe's largest Enterprise Resource Planning software company. By introducing the RunSAP like a Factory (RSLF) methodology SAP forays into assisting their customers in managing applications in a reliable way. The OCC is part of the RSLF methodology [and part of the Product SAP Solution Manager] to ensure efficient and effective application operations. SAP claims that Operations Control Center function as an enabler for highly automated pro-active operations, and that it results simultaneously in reduced operational cost and improved IT service quality and therefore in improved business satisfaction (SAP, 2013).

The OCC is implemented at a number of customers of SAP as part of the SAP MaxAttention RSLF program, but there is still not a scientific independent study on the impact of OCC on the IT service quality in organizations. For the Information Systems (IS) departments, it is imperative that there is credible information readily available to justify continued investments and thus provide more efficient support for business functions.

[…]

SAP claims that the RSLF Operations Control Center ensures highly automated and proactive operations which might result in reduced operational cost and improved IT service quality. The building blocks of OCC at SAP are central monitors, event management process and continuous improvement programs. The central monitors collect and provide information from SAP specific application-operations and business process operations, and non-SAP application and infrastructure components. In the event management block, the business processes and IT landscape components are continuously monitored and a structured process is in place to guide and define the steps between an alert (event) arrival and closure. The continuous improvement block has been envisaged

as a static set-up of central monitors and event management processes are not sufficient to address the challenges in an ongoing manner and to improve operational efficiency.

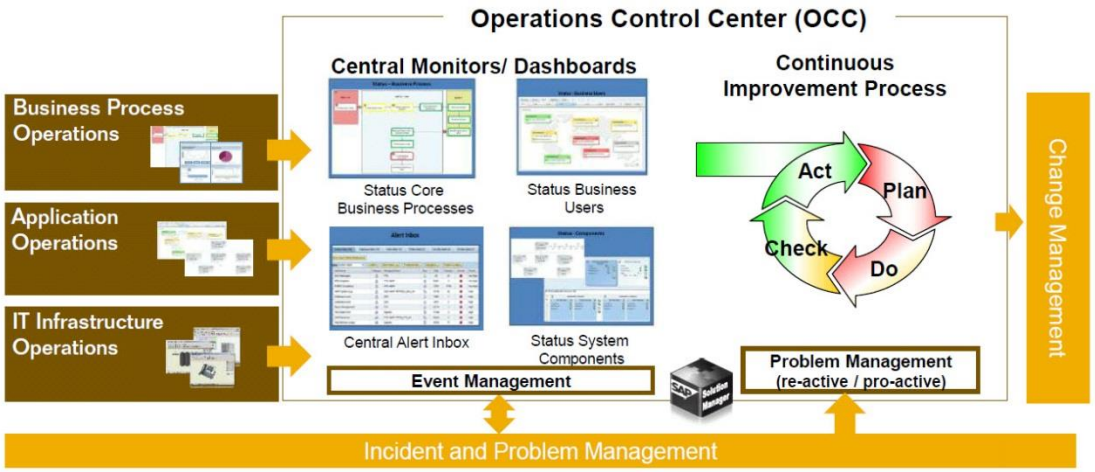


Figure 4: Process view of OCC by SAP[3]

In the Operation Control Center a small team of IT operators takes care of the productive SAP environment. SAP recommends that depending on the environment and the complexity of the business processes and system landscape about 2 FTE ('Full Time Equivalents') per shift could operate the Operations Control Center. According to SAP, the status of the business processes and IT landscape components, all critical business and IT exceptions and alerts are displayed on large screens in the central monitors of OCC and are visible to the operators at any time. A theoretical example of OCC in action is outlined in **Error! Reference source not found.**. In case of problems, partners and SAP can be included by video link. Other IT support teams can be included into the room as well. The control center is set up by the customer with the help of SAP Active Global Support MaxAttention support team. The customer is responsible for leading the room, and staffing a team of technical and functional IT operators, who act on the alerts. In the Operations Control Center concept SAP claims to have a strong integration and dependency into IT Service Management (ITSM), namely into Incident Management, Problem Management and Change Management (SAP, 2013)."

(Augustine, 2014)

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[3] Source: (SAP, 2014)

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