COMBINING COMPARATIVE OUTLIER ANALYSIS AND QCA: A REVIEW OF 25 YEARS (MISSED) OPPORTUNITIES FOR THEORY BUILDING IN MARKETING AND MANAGEMENT STUDIES

An important arena for using Multi Method Research is in the analysis of outliers. They can occur both in quantitative survey-based research designs as well as in qualitative case study research, are clear signals for lacking theory-data fit, and as such prime candidates for theory building (see Katz 1988, Kuhn 1977, Sullivan 2011). A Multi Method Research design taking outliers into account would therefore help re-establish their significance in the theorizing process (Locke, Golden-Biddle, & Feldman, 2008). In Marketing and Management, despite their theory-building prowess, they are often ignored, and swept under the proverbial carpet of model fit (Aguinis, Gottfredson,& Joo, 2013, Gibbert, Nair, Weiss, and Hoegl, 2014). Typically, outliers are small in number, calling for a qualitative, and often comparative analysis of the cases that deviate from the main body of observations which are analyzed quantitatively (Kendall and Wolf 1949, Pearce 2002).

As such, Qualitative Comparative Analysis (QCA) appears to be a particularly promising method in this regard The present proposal sets out to review all published QCA studies in the top 65 Marketing, Management and Organizational Research journals (Tahai &Meyer, 1999) from 1987 (since the inception of QCA) till 2012 (25 years), investigating to what extent QCA researchers addressed outliers. In addition, we conceptually detail two post-QCA research strategies which we term 'Comparative Outlier Analysis' ('COA'); and discuss their relative merits in terms of building more rigorous theory. With QCA getting progressively acknowledged as a viable research method in Marketing, Management and Organization Research (Greckhamer, Misangyi, Elms,& Lacey, 2008; Fiss 2007; Fiss 2011), we believe a Mixed Method Research integrating QCA and COA would be not only timely, but also very relevant for theory advancement.

WHY ANALYSE THE OUTLIERS IN QCA?

The Qualitative Comparative Analysis technique is based on Mill's 'canons', especially the Method of Difference and the Method of Agreement. Both these methods are concerned with establishing common causal relationships by eliminating all other possibilities (Berg-Schlosser, De Meur, Rihoux, & Ragin, 2009). Nonetheless, these rigid positivistic assumptions of cause and effect relationships may not work in the case of social sciences, where a multitude of causes and conditions intersect in time and space to produce a particular outcome. Non-conforming cases might even be more important than typical cases as they can be of great help in the understanding of causal complexity. Unlike in other research methods, where deviant cases or outliers are often neglected as an unavoidable nuisance, QCA 'tends to give explanations without dismissing exceptions or outliers' (Berg-Schlosser, De Meur, Rihoux, & Ragin, 2009). This is because most studies undertaking a regression or similar methods focus on averaging out the constellations of cases under study. QCA, on the other hand, takes into consideration even a combination of conditions which explain only a single case (Berg-Schlosser, De Meur, Rihoux, & Ragin, 2009). Despite this, also in QCA, researchers tend to reject cases that are inconsistent with expectations (Rihoux and Ragin, 2009: 48). The rationale behind this is the belief that these exceptional circumstances are unlikely to be repeated elsewhere. Clearly, from a QCA perspective would be injudicious to take this stance: a cross-tabulation of cause and effect can be considered absolute only if *all* cases (be they deviant or not) are accounted for (Ragin, 1989). As such, we propose to review all empirical QCA work in marketing and management science with the objective of analyzing to what extent outliers have been included in QCA. Specifically, we detail three distinct approaches to analyze outliers in QCA, process tracing of single cases (Schneider and Rohlfing, 2013), versus the *comparative* analysis of several cases.

WANTED: COMPARATIVE ANALYSIS OF OUTLIERS

Analysis of outliers is fundamental from a theory building perspective as even one, single, outlier could invalidate a theory. To build (new) theory, however, a comparative analysis of outliers is needed. Outliers could reveal boundary conditions, contingencies, and conditional effects of the theory in question (George and Bennet, 2005; Gerring, 2007). In other occasions, by pointing out instances which do not fit into the pre-conceived theory, outlier analysis helps the researcher in integrating his theoretical predictions with real–world data more robustly (Lieberson, 1992).

Schneider and Rohlfing (2013) recommended focusing on single outliers using *process tracing* as a Post-QCA step for figuring out the various steps, causal factors and causal pathways that lead to the deviant outcome. Yet, by studying a single case, the utmost we can do is discover some basic categories and properties (Glaser and Strauss, 2006: 62). If the single case does not fit theoretical predictions, it is quite adequate for falsification. That is, if the objective is theory testing (rather than building), process tracing using a single case may be quite adequate. On the other hand, if the purpose is theory building, there is a need for (qualitative) comparative analysis (Gibbert, Nair, & Ruigrok, 2014; Beach and Pedersen, 2013). We put forth two sophisticated COA strategies for analyzing multiple outliers, which build on, but extend, the causal process tracing approach. Apart from playing a prodigious part in theory building, the two COA techniques also amplify the internal and external validity of the study. Thus, while process tracing clearly has its merits, it lacks the *comparative* approach that characterizes QCA. Table 1 shows a comparison of the various outlier analysis techniques in terms of theory building and ensuring rigor.

----TABLE 1 ABOUT HERE ----

COMPARATIVE OUTLIER ANALYSIS- HOW TO ANALYSE OUTLIERS IN A QCA?

In this section, we detail the methodological sophistication of the two research designs and their potential in terms of providing stronger theory, i.e. theory that is more internally and externally valid. These outlier analysis techniques are based on Yin's (2003) 'Replication Logic'. Replication Logic is a tool for enhancing the possibility of making causal claims and comparing cases with regard to plausible alternative explanations, but differ with regard to the independent variables of interest which are believed to cause the observed effects (Gibbert, Nair &Ruigrok, 2014).

'Literal Replication' would involve comparing cases which are similar to each other, are from the same end of the theoretical spectrum and could predict similar results (Yin,2003: 37; Gibbert, Nair, & Ruigrok, 2014). This is similar to the Replication Deviant Case Method (Gibbert, Nair, Weiss & Hoegl, 2014) where several deviant cases with no variation in outcome are selected for within and cross-case comparisons, after a variable-based study. Outlier Literal Replication, the first COA strategy, is based on this technique.

'Theoretical Replication, on the other hand, would involve comparing cases which are dissimilar to each other, are from different ends of a theoretical prediction and predict dissimilar results, but due to predictable reasons (Yin, 2003; Gibbert, Nair & Ruigrok, 2014). This is comparable to the 'Full Range Deviant Case Method' (Gibbert, Nair, Weiss &Hoegl, 2014) in qualitative and quantitative studies. Outlier Theoretical Replication is grounded in this method. As the outlier analysis techniques would differ in csQCA and fsQCA; and also with respect to the necessity and sufficiency of conditions, the subsequent sections are also subdivided along these lines.

Analysis of multiple outliers in Crisp-set QCA

Analyzing and comparing multiple outliers is of great importance in theory building because this helps in establishing the internal validity and external validity of the modified proposition (Lijphart ,1971: 692). By comparing outliers that are similar to each other or different with respect to the typical cases,

the theory building potential and external validity of the study can be enhanced (Eisenhardt, 1989: 537; Yin, 2003: 37). Analyzing two or more outliers permits the researcher to do within and between comparisons that would help him determine whether the deviance noticed is just a one-off case or whether it is observable across several cases (Eisenhardt and Graebner, 2007).

Unlike in prior studies on outlier analysis techniques, the general purpose of our method is not finding the necessary and sufficient conditions for an outcome and explaining how each term is related to the phenomenon of interest exclusively (Berg-Schlosser, De Meur, Rihoux,& Ragin, 2009; George and Bennett, 2005). Rather it is on ascertaining the plausibility of causal relationships between variables (Mill, 1875; Cook and Campbell, 1979), expanding the scope of the theory in hand or even laying the foundations for a new theory. The main focus is on elaborating, fine tuning, and developing theories. For the same reason we are not focusing solely on positive outcomes, but on different combinations of memberships and outcomes (See table 2 for all the Comparative (Multiple) Outlier Analysis techniques in csQCA).

Multiple outlier analysis in csQCA cases of Necessity

Based on the presence and absence of an outcome in the presence and absence of a condition which is 'necessary', cases can be classified into four (figure 1). We first consider the cases where the necessary condition is absent, but the outcome is present. This case is definitely an outlier. If the necessary condition was really 'necessary', the outcome would not have occurred in its absence. This hints the possibility that another condition could have been present for this particular outcome to happen. By applying COA, the researcher could suggest a modification of the theory in hand, which is externally valid beyond the case in hand.

Outlier Literal Replication in csQCA cases of Necessity: The generalizability and theory building potential of a Single Outlier Analysis is miniscule. If the purpose of the research is the same, we

suggest a comparison of the outlier with other similar outcome outliers. The researcher does within and between case comparisons to understand and establish the applicability of the causal factors in other deviant cases. In the case of deviant cases of consistency, which could occur while testing necessity, the Outlier Literal Replication aka, comparison of the deviant cases of consistency with other deviant cases of consistency is carried out. The causal conditions that the positive cases have in common are focused upon, while the conditions that are not in common are eliminated; as they have no explanatory power in this circumstance (Blatter and Haverland, 2012).

Outlier Theoretical Replication in csQCA cases of Necessity: An even more sophisticated Outlier Analysis technique is comparing cases with different outcomes. This means the researcher deliberately chooses outcomes which are on the extreme ends of an emerging, theoretical continuum (e.g. high/low values on the causal condition or causal recipe). When compared with analysis of a single outlier or Outlier Literal Replication, this technique is particularly advanced as it examines cases from extreme ends of a deviant theoretical spectrum, thereby broadening the scope of the theory as well as enhancing the external validity. Even more important, the internal validity of the study could also be enhanced this way. Outlier Theoretical Replication makes it clearer whether a particular cause is in fact 'The One' which contributes to the observed outcome (Geddes, 1990; Dion, 1998). Outlier theoretical replication in this circumstance looks for cases with similar necessary conditions, but different results. That is, it compares the typical cases with the deviant cases of consistency. The researcher would do process tracing before the theoretical replication and attempts to figure out at which point the results failed to follow the prediction. This would lead to a refined hypothesis or identification of further necessary conditions or clarification of the scope conditions (Blatter and Haverland, 2012). To sum up, Outlier Theoretical Replication goes beyond refuting an existing theory and moves towards formulating a potentially new theory.

Multiple Outlier Analysis in csQCA cases of Sufficiency

In cases of Sufficiency (figure 2), there are two different types of atypical cases, deviant for consistency and deviant for coverage (Schneider and Rohlfing, 2013). Deviant cases for consistency contradict the statement of sufficiency by being a member of the QCA solution, but not being a member of the outcome. Deviant cases for coverage, on the other hand, are the ones which are not members of the QCA solution, but still exhibit the outcomes. As such, these types of deviant cases are not exactly contradicting the statement of sufficiency, as the sufficient cause is not necessary for the outcome to occur. However, analyzing them would be fruitful, as this could lead to the discovery of an overlooked causal recipe or condition which could have caused them. The different outlier analysis techniques in the cases of sufficiency are enumerated in the subsequent sections.

Outlier Literal Replication in csQCA cases of Sufficiency: In cases of sufficiency, an Outlier Literal Replication can be done by comparing the deviant cases (consistency) with other deviant cases of consistency. Here, the cases which are members of the QCA solution, but not members of the outcome; are process traced first and then compared with each other. This is similar to the Outlier Literal Replication in the cases of Necessity. Another possibility would be to compare the different deviant cases of coverage with each. In this instance, the cases which are not members of the QCA solution, but still exhibit the outcome; are compared to each other. A thing to be cautious about is that the deviance can be due to any reason other than the sufficient condition, which could make the comparison difficult. The initial process-tracing step would be able to curb or ease this difficulty to an extent.

Outlier Theoretical Replication in csQCA cases of Sufficiency: Outlier Theoretical Replication in cases of Sufficiency can be in two forms. The first comparison could be between typical cases and deviant cases of coverage, where the outcome is present in both instances, with the sufficient term being absent

in the deviant cases. The second comparison would be between typical cases and deviant cases of consistency, where both cases would be members of the QCA solution of sufficiency, with the deviant cases not being a member of the outcome. As discussed before, Single Outlier Analysis and Outlier Literal Replication precedes this analysis.

Analysis of multiple outliers in Fuzzy-set QCA

The basic idea behind outlier analysis in fsQCA is quite similar to that in csQCA. It follows the same principles as csQCA outlier analysis. However, as fsQCA handles varying degrees of membership in the causal condition and outcome (Ragin, 2008), it provides a wide range of typical and outlying cases for Comparative Outlier Analysis. The initial step here would also be conducting the analysis of a single outlier. The Outlier Literal Replication and Outlier Theoretical Replication would follow consecutively. (See table 3 for all the Comparative (Multiple) Outlier Analysis techniques in fsQCA).

Multiple Outlier Analysis in fsQCA cases of Necessity

Like with the crisp sets, in fuzzy set QCA also cases differ according to the necessity and sufficiency of causal conditions or causal recipes. In necessity, the instances of outcome constitute a subset of the instances of the causal condition (Rihoux and Ragin, 2009). This is quite important as the subset relation signals the connection between the causal conditions and the outcome. Instances which are inconsistent with the subset relation thus are not considered as typical cases. Figure 3 shows the cases in fsQCA of Necessity which could be suitable candidates for Comparative Outlier Analysis.

Outlier Literal Replication in fsQCA cases of Necessity: Analysis of fsQCA outliers of necessity would require a comparison of the deviant cases of consistency (situated at the top-left hand corner of the plot) with deviant cases of consistency from the same location. This is the main kind of Outlier Literal Replication which we suggest. Another possible category of deviant cases of consistency are situated at the top-right hand corner of the plot. These deviant cases are quite similar to the typical cases in terms

of their membership in the causal term and outcome. However they do not satisfy the subset relation of necessity (Schneider and Rohlfing, 2013). Comparing them with each other would also be another interesting Outlier Literal Replication technique.

Outlier Theoretical Replication in fsQCA cases of Necessity: Outlier Theoretical Replication of fsQCA cases of Necessity meanwhile provides more exciting opportunities for cross-case comparison. Theoretical replication of the cases here would involve comparing the typical cases with the deviant cases of consistency[1]. As fsQCA accounts for the degree of membership and could have values anywhere between 0 and 1, there could be more than one type of typical cases available for this analysis (Beach and Pedersen, 2013). An Outlier Theoretical Replication in this context could involve a comparison of the outlying cases (of degree and of kind) with typical cases with a high membership in both necessary term and outcome (most likely cases, according to Beach and Pedersen, 2013). Another possibility would a comparison of the outlying cases with typical cases with a not high membership in the necessary term and outcome. These are cases which still have a membership in both the outcome and the necessary term, but are 'least likely' (Beach and Pedersen, 2013) to occur.

Multiple Outlier Analysis in fsQCA cases of Sufficiency

FsQCA Sufficiency provides a myriad of cases for Comparative Outlier Analysis (figure 4). The typical cases are the ones which lie on the upper right hand side of the spectrum (above the diagonal as they are consistent with the statement of sufficiency). The cases in the lower half of the diagonal are inconsistent with the statement of sufficiency and are thus deviant. The cases on the lower-right end of the spectrum (both the ones above and below the diagonal) are irrelevant for the outlier anaysis as they have no or negligible membership in the outcome or the sufficient term. Another possible type of outliers that could be found in the fsQCA of Sufficiency are the ones occupying the upper, left hand

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[1] Schneider and Rohlfing (2013) further subdivide these deviant cases into deviant cases of consistency in degree and deviant cases of consistency in kind.

side of the spectrum. They have no membership score in the suffcent term, high membership score in the outcome and are consistent with the statement of sufficiency. These are the 'deviant cases of coverage'.

Outlier Literal Replication in fsQCA cases of Sufficiency: Outlier Literal Replication of fsQCA sufficiency cases would involve a comparison of the deviant cases of consistency with other deviant cases of consistency. This would involve comparing deviant cases of consistency in degree (similar to typical cases) with other deviant cases of consistency in degree. Another (more important) possibility is comparing deviant cases of consistency in kind (high membership score on the sufficient term and low membership score on outcome) with other deviant cases of consistency in kind. Analyzing deviant cases of consistency in kind could help identify the reasons why the supposedly 'sufficient' causal condition/ recipe is not producing the expected outcome.

Yet another Outlier Literal Replication in this context would involve comparing the deviant cases of coverage with other deviant cases of coverage. This is useful when the focus of the analysis is on identifying the reasons behind the high membership in outcome despite having no membership in the sufficient term.

Outlier Theoretical Replication in fsQCA cases of Sufficiency : Theoretical replication of outliers in fsQCA cases of Sufficiency implicates comparing typical cases with the deviant cases. This provides an extensive range of possible comparisons. The 'most likely' cases are compared with the deviant cases of consistency (degree and kind) and the deviant cases of coverage, providing three possible ways of comparison. Likewise, the least likely could also be compared with the three types of deviant cases, providing yet another triplet of opportunities for theory enhancement.

PLANNED EMPIRICAL WORK

For the full paper, we plan to look into all the published QCA studies in the top 65 Marketing,

Management and Organizational Behavior journals (Tahai and Meyer, 1999) from 1987 (since the

inception of QCA) till 2012 (25 years). To identify authors explicitly mentioning outliers, we would go

through all the studies manually. We would then scrutinize all the studies mentioning the presence of

outliers or outlying cases to see if any of them performed any follow-up outlier analysis. We expect to

find articles which could potentially illustrate or provide a ground for the analysis techniques we are

suggesting. Subsequently, we plan to look into the whole population of published QCA studies in

Marketing, Management and Organizational Behavior (1987-2012).

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Table 1: Comparison of Process Tracing and Outlier Analysis techniques

	PROCESS TRACING		MULTIPLE OUTLIER ANALYSIS	
			OUTLIER LITERAL REPLICATION	OUTLIER THEORETICAL REPLICATION
Main purpose	a.	Theory testing	a. Theory building	a. Theory building
	b.	Theory falsification		
Rationale	a.	Identifies additional causal factors/ conditions/ mechanisms	a. Illustrates causal factors/ conditions/ mechanisms that are applicable to other similar deviant cases	a. Identify additional causal factors/ conditions/ mechanisms
	b.	Points out the boundary conditions of a particular theory		b. Manifest how they behave along a range of possible outcomes
Potential problems	a.	No strong basis for theory building	a. May be subjected to sampling bias	a. Identifying suitable cases for the analysis might be difficult
	b.	Narrow scope (limited external validity)		
Main benefits	a.	Enhances internal validity of causal claim	a. Illustrates consequential causal factors/ conditions/ mechanisms applicable beyond a single case	a. Enhances internal validity
			b. Enhances external validity	b. Broader scope (Further enhances external validity)

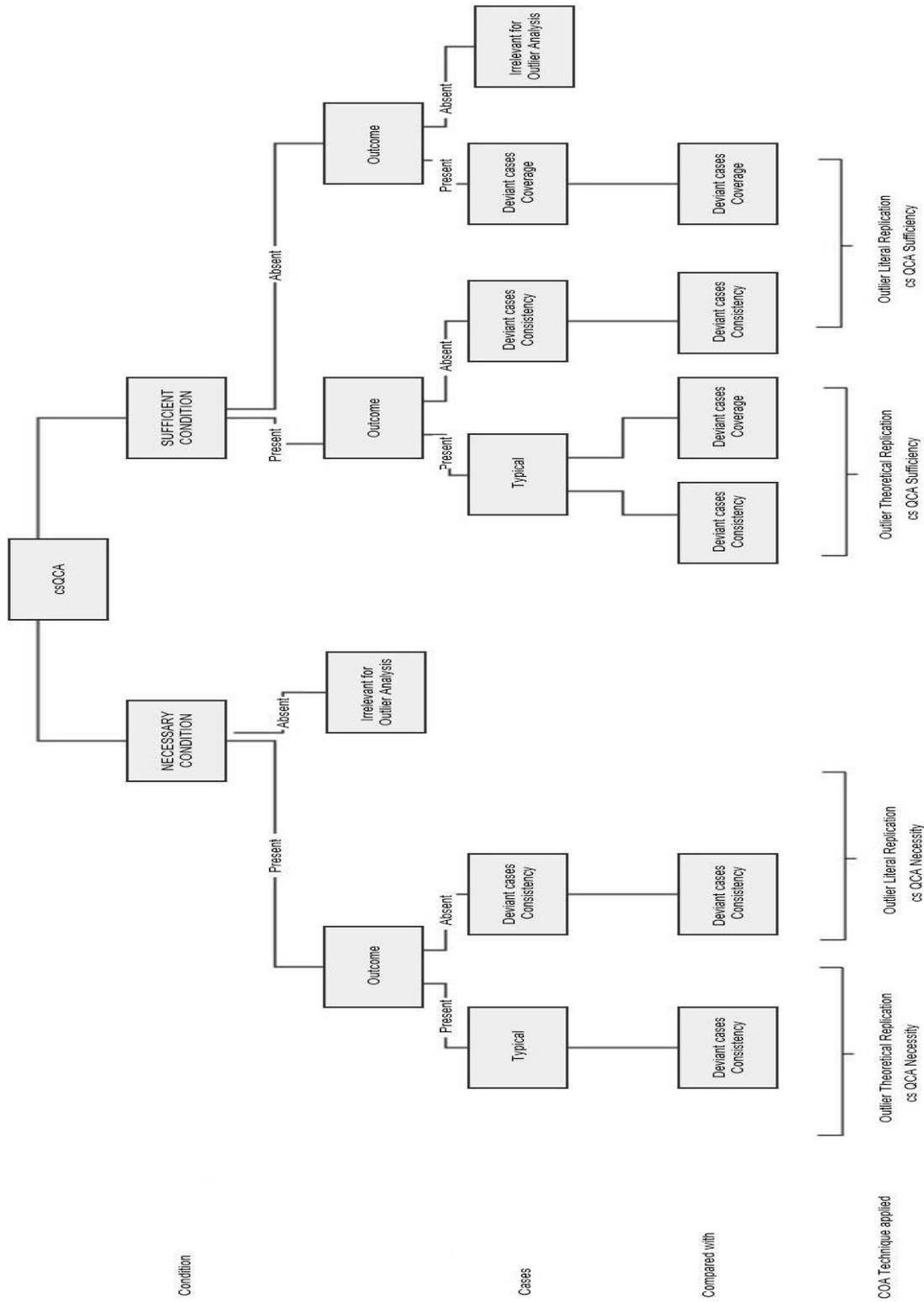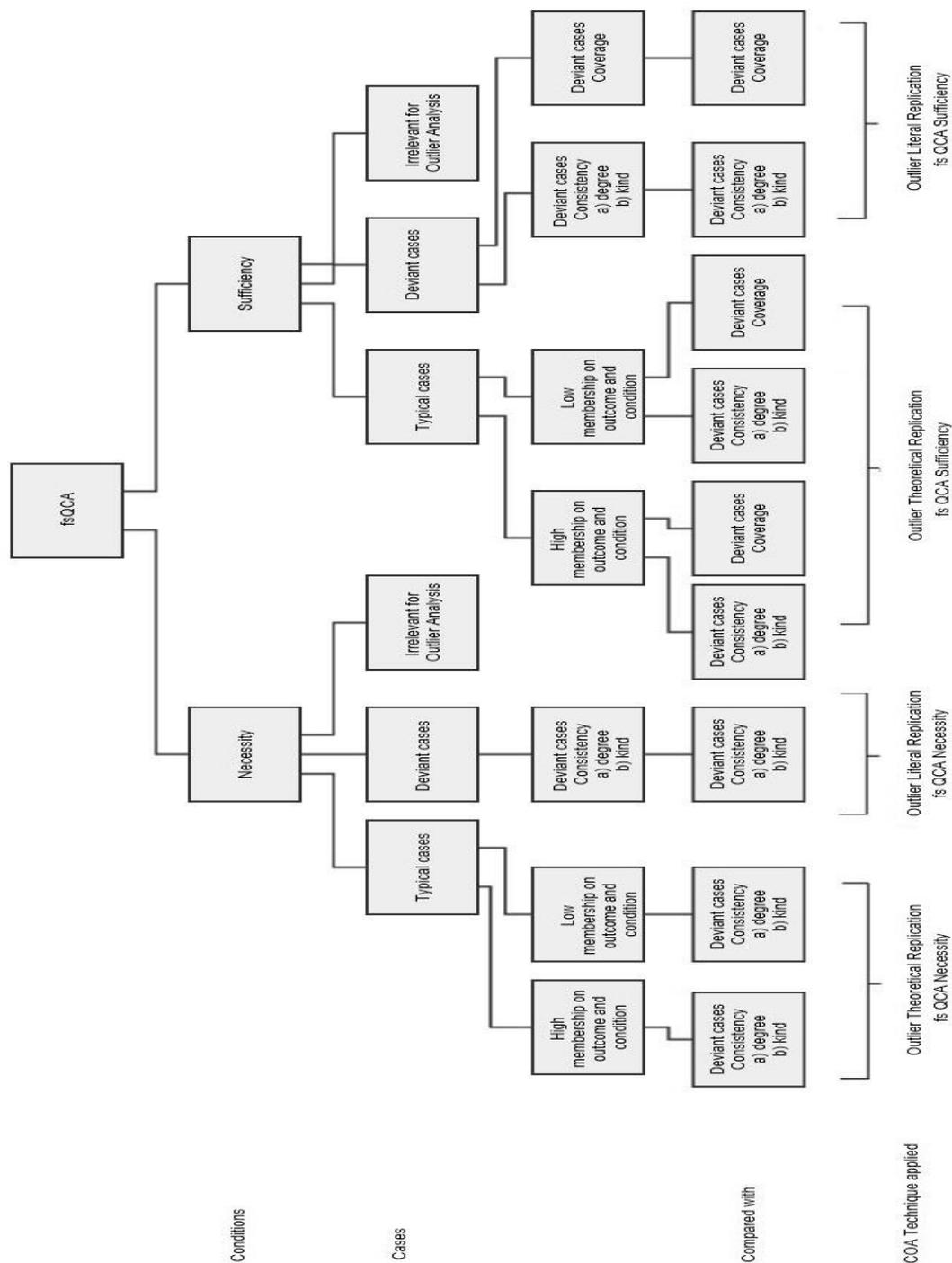**Table 2: Comparative Outlier Analysis in csQCA (in a nut shell)**

Table 3: Comparative Outlier Analysis in fsQCA (in a nut shell)

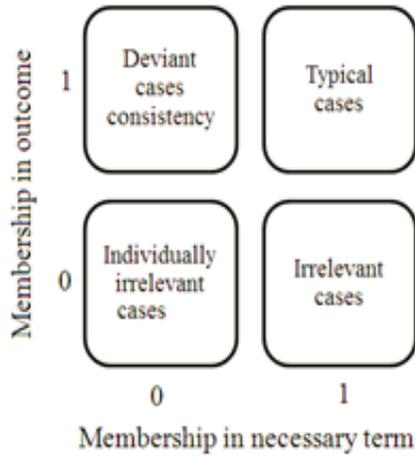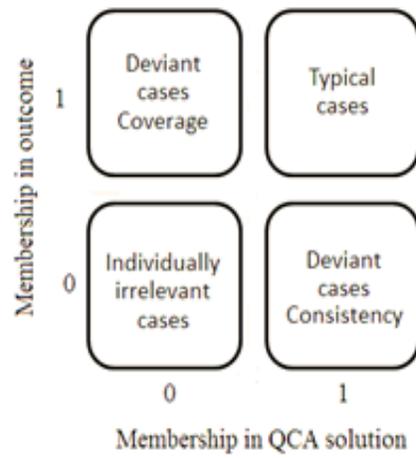Figure 1: Type of cases in csQCA for Necessity

Figure 2: Type of cases in csQCA for Sufficiency

Adapted from Schneider and Rohlfing (2013)
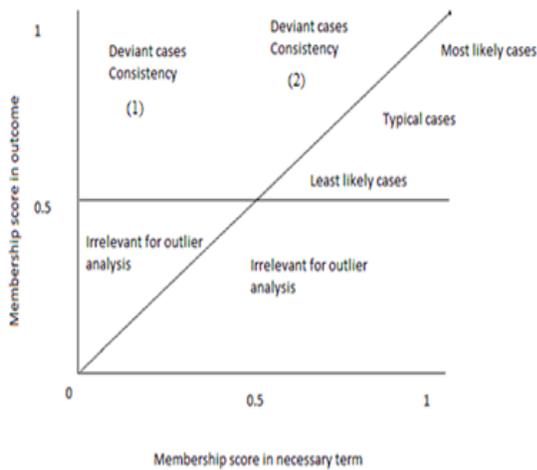
Figure 3: Type of cases in fsQCA of Necessity

Figure 4 : Type of cases in fsQCA of Sufficiency