

QUALITATIVE COMPARATIVE ANALYSIS (QCA)

Qualitative Comparative Analysis (QCA) is a methodology that enables the analysis of multiple cases in complex situations. It can help explain why change happens in some cases but not others. QCA is designed for use with an intermediate number of cases, typically between 10 and 50. It can be used in situations where there are too few cases to apply conventional statistical analysis.

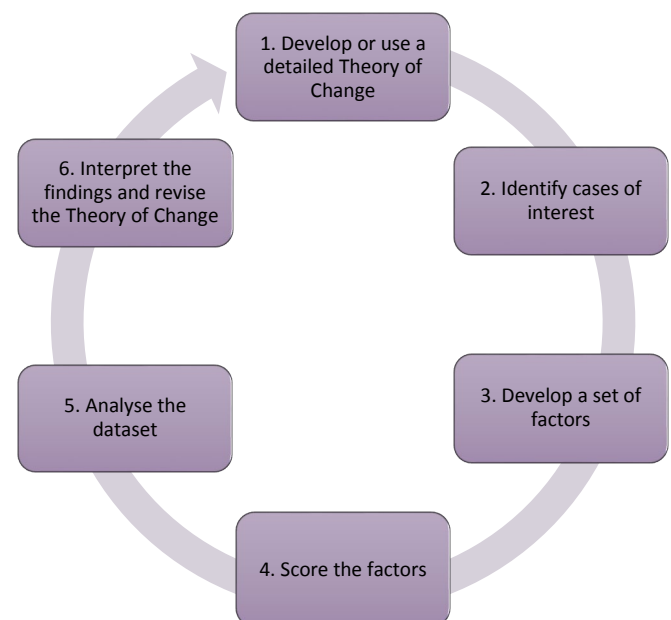
Qualitative Comparative Analysis (QCA), developed by Charles Ragin in the 1970s, was originally developed as a research methodology. Lately, it has increasingly been applied within monitoring and evaluation (M&E). QCA is a methodology that enables the analysis of multiple cases in complex situations, and can help explain why change happens in some cases but not others. Sometimes QCA involves the collection of new data. At other times QCA can be applied to data that has been collected previously. Some of the main features of QCA are as follows.

- QCA is a case-based approach. Case studies are regularly used within M&E to investigate situations in particular contexts and settings. But they have often been considered of little use for generating findings that can be generalised across different projects and contexts. QCA seeks to overcome this difficulty by systematically and transparently generating findings across multiple case studies (Baptist and Befani 2015).
- QCA is one of the few M&E methodologies that uses both quantitative and qualitative analysis. It requires in-depth knowledge of cases (often part of qualitative analysis) but is also capable of generating findings that can be generalised across wider populations (quantitative analysis).
- QCA is designed to cope with complexity and the influence of context. It is based on two assumptions: firstly that change is often the result of different combinations of factors, rather than on any one individual factor; and secondly that different combinations of factors can produce similar changes (Ragin 1984).
- QCA is designed for use with an intermediate number of cases – typically between 10 and 50. It can therefore be used in situations where there are too few cases to apply conventional statistical analysis techniques, which require statistically significant sample sizes, and too many for a purely qualitative case-study based approach.

Basically, QCA is a methodology that helps people look for patterns across multiple cases to better understand why some changes happen and others don't. If used within the field of M&E, this information can then be used to improve planning and performance in the future

How it works

QCA is meant to be used as a rigorous process. Therefore the different steps are quite well defined, and should be applied consistently across all QCA studies. However, the different steps may not always be carried out in the same order, and can sometimes be carried out in parallel. The different steps are shown in the diagram below.



The first step is normally to **develop a theory of change**. Alternatively, an existing theory of change can be used. The theory of change should be designed to identify two things: the change the QCA study is interested in, and the factors that (in theory) help bring about those changes. For QCA, a theory of change could be based on many different sources of information, such as social science theory, a project or programme theory of change or simply personal or organisational experience (see Schatz and Welle, 2016).

The theory of change needs to be explicit about the change which is to be analysed. In QCA terms this change is normally known as the **outcome**. An outcome can be a change brought about by a development organisation (such as increased survival rates following surgery or adoption of

research by policy-makers) or a wider topic (such as regime failure).

STEP TWO

The next step, often undertaken in parallel with the first one, is to **identify the cases** that will be analysed as part of the QCA. For QCA to work properly, some of the cases should be ones in which the 'outcome' happened and

some should be similar cases in which it did not. For example, if the 'outcome' of a QCA study is regime failure then some of the cases should be ones in which regimes failed and some should be cases where they did not.

Depending on the topic, cases can look very different in different QCA studies. For example, cases could be different governments, schools, hospitals, intervention types, programmes, projects or households. But it is important that the cases are consistent with each other. For instance, QCA should not be used to compare cases involving individual hospitals with ones based around entire health systems in developing countries.

STEP THREE

Based on the theory of change, a set of **factors** (sometimes known as **conditions**) needs to be developed.

These are the key factors whose presence or absence may contribute to the 'outcomes'. It is important that,

wherever possible, all the factors covered by the theory of change are included in the study. The box below shows some possible factors, based on different QCA studies.

Outcome	Presence or absence of potential factors
Collapse of military regimes (based on Ragin 2008)	<ul style="list-style-type: none"> • conflict between older and younger military officers • death of dictator • dissatisfaction with regime • high inflation • whether country is at war with another country
Uptake of research by policy-makers (based on Scholz et. al. 2016)	<ul style="list-style-type: none"> • previous relationship between researcher and policy-makers • expressed demand for research work • research fills policy-relevant gap in knowledge • engagement of policy-makers throughout research • credibility of research • communication of research findings
Improved survival rates at hospitals following surgery	<ul style="list-style-type: none"> • high qualification levels of surgeons • high level of funding for hospitals • low poverty levels in areas surrounding hospital • whether or not operating theatres have been modified in past 5 years • recent training provided to surgeons • whether or not hospital receives referrals from other hospitals

Once the cases and factors have been established it is important to learn as much as possible about each case. Sometimes that information is already available, perhaps through project or programme evaluations, monitoring records, academic papers, etc. However, sometimes it is necessary to go out and collect more information.

In some QCA studies each case is then written up into a qualitative case study, covering the 'outcome' for each case, and information on all the potential factors. But not all QCA studies require this.

STEP FOUR

After the cases and factors have been identified the next task is to **score the factors**. This involves looking at each factor in turn across all the cases, and developing some criteria for how it should be scored. This is best done

after all the required information has been collected on the cases.

Using the criteria, the qualitative data for each factor in each case is converted into a score. In a **crisp set** QCA (see box below) the score is always either '0' or '1' – '0' meaning an absence and '1' a presence. For example, if the factor is 'whether or not operating theatres have been modified in the past five years' then a '1' would indicate that they have been modified and a '0' that they have not. If the factor is 'high level of funding for hospitals' then some criteria needs to be developed to state what is meant by a 'high level of funding'. This could be, for instance, that any hospital receiving over \$1 million per year receives a '1' and less than \$1 million a year a '0'.

Crisp and Fuzzy Set QCA

QCA scoring based on binary scores is known as 'crisp-set' QCA. It is the more common type of QCA, and is almost always used in manuals and guidance documents as it is easier to understand. However, some QCA studies use 'fuzzy-set' analysis. In a fuzzy set, scores can be set at different levels, although always between '0' and '1'. For example, scores could be rated as '0', '0.33', '0.66' or '1'.

Fuzzy sets make it easier to rate factors that cannot be simply classified as present or absent. For example, if a factor is 'dissatisfaction with regime', fuzzy set analysis would allow people to distinguish between regimes where there was a very low level of dissatisfaction ('0'), regimes where there was some articulated dissatisfaction in some areas ('0.33'), regimes where dissatisfaction amongst some groups had led to organised protest ('0.66') and regimes where there was widespread dissatisfaction and protest ('1').

The main difference between crisp set and fuzzy set analysis is in the processing and interpretation of the data.

STEP FIVE

Once all the data has been collected and the factors scored, the next step is to **analyse the dataset**. For very small numbers of cases this can be done by scanning the scores and looking for patterns by eye. However, within QCA,

dataset analysis is most often done by using computer software. The computer software provides a more rigorous way of analysing patterns, and is capable of coping with very large numbers of cases and factors.

The most commonly used software, at present, is called fsQCA. It is free to download and use. The software performs a number of different calculations on the dataset, and then presents the user with several solutions. These solutions outline the combination of factors that appear to be present (or absent) in cases where the 'outcome' was realised. There is usually more than one set of combinations, meaning that there is more than one pathway that can lead to the same 'outcome'.



The final step is regarded by some as the most important. Once the computer software has identified the different combinations of factors, it is important to **interpret the findings**.

This means going back to the individual cases and asking whether or not the findings make sense.

Often, at this stage, it is necessary to go back to the cases and review the scoring criteria, or the factors included in the study. Sometimes it is necessary to run further checks using the computer software. In some cases it might be necessary to collect further data on some of the cases, especially cases that do not seem to conform to expectations. Sometimes it may be necessary to go back and examine the theory of change and ask if there are other factors that might be important, or whether the theory of change is still valid.

This process of going back and forth between the computer analysis, the cases, and the theory of change means QCA is an iterative process, usually involving several rounds of within-case analysis and cross-case comparisons (see Scholz et. al. 2016 and case study opposite). Once a satisfactory solution has been achieved the results of the QCA study can then be published or used in other ways. Sometimes this is the end of the QCA study, but in other cases the study can continue, with new cases and information being added over time.

Strengths and weaknesses

As explained in the introductory section, the main strength of QCA lies in its focus on in-depth cases, combined with an ability to draw out patterns across many different cases. This avoids some of the weaknesses of purely qualitative approaches – which often fail to produce replicable findings – or quantitative approaches – which often fail to account for different contexts (ibid). Some of the other strengths of QCA are as follows.

- QCA provides a rigorous methodology for understanding change across a small or intermediary number of cases. QCA does not require statistically significant sample sizes, and can therefore be applied in circumstances where there are too few cases to carry out conventional types of statistical analysis. Yet QCA is also an approved and transparent methodology

Case study: Research uptake in CDKN

The Climate and Development Knowledge Network (CDKN) is an alliance of organisations delivering support to developing countries on climate change and development. CDKN's policy research intends to bridge the gap between climate change science and the information needs of decision-makers, in order to influence development discourse, practice, policy and plans.

Prior to the QCA study, the CDKN research team had articulated its assumptions about the factors that lead to research uptake. CDKN's M&E team had already conducted reviews of each sizeable research project six months to two years after completion, to establish medium- to longer-term results. Against this background of a robust theoretical framework and available case data, CDKN developed a QCA study with the central research question being: *"Which combinations of conditions lead to CDKN's research being taken up by key policy-makers within two years of research completion?"*

CDKN first prioritised a shortlist of factors seen as most important for research uptake in decision-making. These were as follows:

- the scale of the research (local, global etc.);
- an identified policy-relevant knowledge gap;
- explicit demand from policy-makers;
- previous relationships between researchers and policy-makers;
- policy-maker engagement during the project;
- the targeted communication of findings;
- credibility and research quality;
- the influence of the research on debates;
- planning for sustainability; and
- alignment with the design and implementation of other CDKN projects.

The QCA analysis was run with 20 cases (completed research projects). In 8 out of 10 cases where there had been some uptake of research findings, the following factors were always present: credibility of research findings, strong, targeted communication of research findings, strong engagement of policy-makers throughout the research project, explicit demand for the research project from policy-makers; and a high level of influence on debates, characterised by invitations to present in important fora or references in high profile literature.

Two other combinations of factors that had led to successful uptake were also identified. These led to further investigations in the cases concerned to see why this had happened. In one case it was because research carried out in one part of CDKN had been introduced to policy-makers in another region of the world by a different team. In the other, the findings of the research had been so useful and timely that policy-makers had picked them up in spite of the fact that they had had no direct involvement in the research.

The findings of the QCA study eventually led to a revision of the research team's Theory of Change, and also informed new research commissioning

Source: Scholz et. al. 2016.

that allows findings to be tested and/or replicated by others.

- In some circumstances, QCA is able to test project or programme theories of change. A project or programme theory of change usually involves the identification of key assumptions which may affect

pathways to change, and QCA can test these assumptions. It does this by identifying which factors (or conditions) are necessary for change at one level (e.g. output level) to result in change at another (e.g. outcome or impact level).

- QCA is good at addressing questions around why some interventions worked and not others. This is particularly useful for evaluations where people are interested not just in the results of a project or programme, but also in how and why those results were achieved. QCA can therefore be used to help decide whether and/or how projects or programmes could be scaled up or replicated (Baptist and Befani 2015).
- When used within M&E, QCA is a methodology for learning. The methodology does not include any inherent processes for measuring change. Instead, its main focus is on generating lessons and recommendations.

As with almost all complex methodologies, the weaknesses of QCA are often more to do with the way in which it is applied. However, QCA does have some limitations that need to be recognised.

- Firstly, QCA requires a minimum number of cases before it can be used. Opinions vary, but ten cases is often quoted as a practical minimum. If there are less than ten cases then it is doubtful whether it is worth implementing a QCA study.
- QCA cannot cope with missing data. In a QCA study all the factors need to be scored for all of the cases. If information is lacking in one factor in one case then it is not possible to use that case as part of a QCA analysis. So either the factor must be removed from the study or the case must be removed. This can lead to situations in which important influencing factors may be ignored (Schatz and Welle 2016).
- The scoring process for factors can require quite complex judgements, and there is a risk that scoring can become too subjective. This is particularly true of crisp-set QCA which effectively divides all factors into 'yes-no' answers.
- It can be hard to predict at the start of a QCA study how much time or resources will be needed. This is because good practice means constantly going back and forth between the analysis, the cases and the theory of change. This means QCA may not be appropriate for evaluations that need to be carried out to fixed timescales and/or with fixed budgets.
- QCA can be a time-dependent exercise, and this has important consequences for how effective it is as an M&E tool. For example, if trying to establish the key factors that lead to successful advocacy campaigns it is first necessary to work out which cases led to successful outcomes and which did not. But some advocacy campaigns can take years to result in policy change. In the case study on the previous page a gap of two years was allowed between the end of a research project and potential policy uptake. But some research

projects might take longer, and it would be misleading to prematurely label them as failed projects. Therefore, if done too early, a QCA might produce misleading results. But if done too late there is a risk that the information will be of little practical use.

QCA within an M&E system

To-date, QCA has largely been used either within the research community, or as part of a one-off evaluation or impact assessment. INTRAC has recently experimented with QCA as part of an ongoing M&E system. The work was carried out by an internal team with knowledge of different M&E data collection and analysis techniques, but no prior knowledge of QCA.

Overall, INTRAC's conclusion was that, given sufficient time, QCA can be carried out by a team without prior knowledge, and a QCA study can enhance existing M&E systems by contributing to revised theories of change, generating learning, providing recommendations to inform future planning, and displaying accountability to donors. However, for newcomers to QCA there are some potential pitfalls to be aware of.

- The mathematics behind QCA is quite complex. Although it is not necessary to understand all the mathematics to be able to apply a QCA or run the software, it is useful to at least understand the principles.
- The current software available is not particularly user-friendly, and it took a while to get used to it. There is guidance for the software, but it is not that simple for non-experts, and a certain amount of trial and error is needed.
- At times the software requires the user to make choices between different options. It is not always clear how to make the choices without more extensive background knowledge of QCA, yet different choices can lead to different findings.
- There are different software packages that contain different algorithms (different ways to look for patterns). This can also affect the findings.
- The solutions (or findings) generated by the computer are not always intuitive. They need some interpretation, and some understanding of why those particular findings were chosen and not others. QCA does not substitute for discussion and sense-making of findings.
- Finally, there are certain tricks of the trade that can be used to confirm or reject different findings, or speed up the process of analysis. These are not always obvious to the beginner.

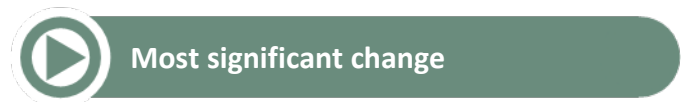
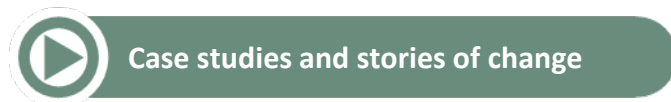
In INTRAC's case it was eventually decided to hire an expert consultant for a few days to provide some input into these key areas, particularly the use of the software. This is important as there is little written guidance on QCA that is detailed enough to use, yet accessible enough for non-experts.

INTRAC's overall assessment is that QCA is a very useful methodology for ongoing M&E as well as one-off evaluations, particularly for organisations or programmes running many different projects in different places, wanting to know why some are effective and not others. Initially, a

lot of time may need to be spent in understanding the principles, applying the methodologies and testing out the software. However, once this has been it should be possible to use the QCA methodology much more rapidly as an aid to cross-case analysis.

Further reading and resources

Further papers in this part of the M&E Universe deal with other data collection and analysis methodologies based on investigation of multiple cases.



Some good, basic guides to QCA can be found in the papers listed under the references, especially Baptist and Befani, 2015; Ragin, 1984; and Schatz and Welle, 2016. A comprehensive guide to the most common QCA software can be found at <http://www.u.arizona.edu/~cragin/fsQCA/download/fsQCAManual.pdf>. The software itself is freely available as a download from various places in the internet, found by searching on the term 'fsqca download'. INTRAC's own experience in running a QCA through CDKN is contained in Scholz et. al., 2016, listed under the references below.

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