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# **In Search for Effective Public-Private Partnerships: An Assessment of the Impact of Organizational Form and Managerial Strategies in Urban Regeneration Partnerships Using FsQCA**

Michiel Kort, Stefan Verweij & Erik-Hans Klijn

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## **Abstract**

A public-private partnership (PPP) is an organizational arrangement in which knowledge and resources are pooled in order to realize outcomes. Although PPPs have become common practice in spatial planning and development, there is a continuous search for their ideal organizational form and management. This is fueled by the often poor performance in terms of e.g. time delays and budget overruns. Whilst comparative studies have been conducted into the outcomes of certain organizational forms and management strategies, fewer comparative studies evaluate their combined effects. The goal of this study is to explore what configurations of certain organizational forms and management may produce good outcomes. This is done by conducting a fuzzy set qualitative comparative analysis (fsQCA) of survey data of 50 managers involved in urban regeneration companies (URCs) in the Netherlands.

## **Keywords**

Public-Private Partnerships, Partnership Performance, Partnership Form, Partnership Management, Fuzzy Set Qualitative Comparative Analysis

# **In Search for Effective Public-Private Partnerships: An Assessment of the Impact of Organizational Form and Managerial Strategies in Urban Regeneration Partnerships Using FsQCA**

## **1. Introduction**

It is widely known that spatial planning projects are haunted by a lingering history of poor performance in terms of, amongst other things, time delays and budget overruns. The seminal work by [Flyvbjerg et al. \(2003\)](#) is illustrative in this respect. They conclude that private sector involvement may increase the performance of projects. This is also the central idea of public-private partnerships (PPPs); cooperation between public and private actors may result in added value ([Ghobadian et al., 2004](#); [Hodge et al., 2010](#); [Osborne, 2000](#)).

### **1.1. Urban regeneration companies as PPPs**

One field in which PPPs are gaining ground is urban regeneration. The literature reports on a variety of urban regeneration partnerships ([Geddes, 2008](#); [Pierre, 1997](#)). In various countries, new organizations are created where public and private actors are working together to stimulate, guide and implement processes of urban regeneration. These organizations are relatively independent, performing their activities at arm's length from the political arena. Such companies are often referred to as urban regeneration companies (URCs) and they can be found in many countries like the United Kingdom (UK) and the Netherlands. In the UK, URCs emerged after a report from the Urban Task Force (1999). This report stated that urban regeneration could be increased if arm's length organizations, owned by local partnerships, were made responsible for delivering programs in terms of raising financial means, and for undertaking and overseeing direct development when deemed necessary.

This idea of creating a form of PPP specifically aimed at solving problems in urban areas was also suggested in the Netherlands ([VROM-Raad, 2002](#)). The actors in the URC create and manage an intensified partnership in which they all share some of the risks involved in the endeavor. In the Netherlands, important partners include the local authority, housing associations and private parties such as developers and banks. Because no national guidelines exist, the Dutch landscape of URCs is characterized by a wide variety of organizational forms, ranging from tightly organized consortia to more loosely coupled organizations ([Kort, 2011](#)). However, in all forms the partners share control over the use of resources and the decisions that have to be made.

### **1.2. Why partnerships would perform better**

There are different arguments why PPPs would produce better outcomes. The first argument concerns their *organizational form* and relates to the New Public

Management (NPM) literature: because PPPs are positioned at arm's length from the political decision-making arena and because they are organized as a distinct organizational identity, they are believed to be able to work more effectively and efficiently (Hodge and Greve, 2005; Osborne and Gaebler, 1992). However, projects are planned and realized in networks of actors that are interconnected through resource dependencies, which are simultaneously fragmented in terms of e.g. goals, knowledge and resources (Koppenjan and Klijn, 2004; see Hodge et al., 2010). A public-private partnership is a specific organizational arrangement in which these public and private resources are pooled and managed to realize spatial projects. The second argument stems from the governance network literature and posits that *network management* is crucial to cope with the complexities and dynamics of networks surrounding PPPs and therefore a crucial factor for successful PPPs (cf. Van Gestel et al., 2012).

Previous analyses looked at which explanation is the most plausible for producing good outcomes (Kort and Klijn, 2011; Steijn et al., 2011). In this study we aim to add to this literature by exploring what *combinations* of organizational forms and management result in good outcomes in PPPs. To this purpose, fuzzy set qualitative comparative analysis (fsQCA) (Ragin, 2008a) is used to answer the following research question:

*What combinations of organizational form and management strategies produce good outcomes in public-private partnerships in urban regeneration?*

This question is answered in several steps. The theoretical framework is presented in the next section. It discusses URCs as PPPs, and the importance of organizational characteristics and network management respectively. Section 3 introduces the fsQCA methodology and its relevance for our research question, and it presents the operationalization, the survey data and the calibration of the data into fuzzy sets. The results of the fsQCA are presented in Section 4. Section 5 comprises the discussion and conclusions.

## **2. Theoretical framework: NPM and/or governance**

A PPP can be defined as a “co-operation between public and private actors with a durable character in which actors develop mutual products and/or services and in which risks, costs and benefits are shared” (Klijn and Teisman, 2003, page 137). It is assumed that a more intensive cooperation between public and private actors will add value by producing better and more efficient policy outcomes (Ghobadian et al., 2004; Hodge and Greve, 2005; Savas, 2000). Private parties are involved earlier in the decision-making process and are said to contribute more intensively than is the case in more traditional client-supplier or principal-agent relationships. In the arguments about why PPPs would be effective, different arguments that come from different theoretical streams of literature can be recognized. On the one hand, emphasis is laid on the organizational form. In general, theoretical arguments in favor of the organizational features come from rational choice theory, principal-

agency theory and sometimes resource-dependency theories (Section 2.1). On the other hand, the importance of management is stressed. Arguments favoring management are rooted in network governance theory (Section 2.2).

### **2.1. PPPs: theoretical arguments in favor of organizational form**

The arguments in favor of PPPs that emphasize the organizational form state that contracts and public-private separation will produce better and more efficient outcomes than when the service is provided by governments themselves ([Hood and Jackson, 1991](#); [Lane, 2000](#)). [Pollitt et al. \(2004\)](#) indicate that the dominant inspiration for trends towards agencies and other arm's length organizations comes from rational choice theories that stress the ability of these organizations to organize services or policies more efficiently. Since bureaucracies tend to maximize the number of staff and budgets, and because they are not under the pressure of market competition, they are less efficient than private organizations ([Hood and Jackson, 1991](#); [Pollitt et al., 2004](#)). Relatedly, contract theories ([Deakin and Mitchie, 1997](#); [Lane, 2000](#)) and principal-agency theories specify the conditions under which agencies or other arm's length bodies like PPPs perform well. There is a need to specify outcomes and monitor performance and behavior according to these theories ([Hodge and Greve, 2005](#); [Hood and Jackson, 1991](#); [Hodge et al., 2010](#)).

Thus, this body of literature emphasizes efficiency and effectiveness, caused by increased competition, the need to perform according to clearly specified performance targets and the possibility of monitoring those targets ([Verhoest et al., 2004a](#)). Of course, the question remains as to what type of organization is most suited to realize the benefits. In general, the argument is that these are tightly-organized arrangements, which really are able to act on their own (i.e. at arm's length) and thus need discretionary powers. Indeed, what is the use of a separate body that can organize its own delivery and performance if it does not has the possibility to act (see [Hood and Jackson, 1991](#); [Lane, 2000](#); [Pollitt et al., 2004](#))?

Theoretical arguments for a tight organizational structure between the partners stem from resource-dependency theories ([Benson, 1982](#); [Pfeffer, 1981](#)) and neo-institutional economics ([Williamson, 1996](#)). Resource-dependency theory suggests that the more interdependent partners are, the larger the need for organizing interactions ([Donaldson, 1995](#); [Mulford and Rogers, 1982](#)). Indeed, partnerships are initiated because partners hope to harness each other's resources. This, in turn, generates a stronger resource dependency. The same assumption can be found in neo-institutional theory. Partners invest in the relationship and incur specific transaction costs for this relationship which cannot be used for other relations ([Williamson, 1996](#)). Consequently, the level of dependency – and the possibilities that actors take advantage of that interdependency because the actor that made the investment cannot use that investment in another way – increases which in turn leads to a tight organizational structure in which partners try to minimize the ability of the other partner to walk away with a large share of the profits.

To recapitulate, the literature expects PPPs and thus our URCs, to be efficient and effective since private involvement is organized in separate organizations at

arm's length that actually have the possibility and structure to act on their own (and thus have discretionary powers to act).

### **2.1.1. Arm's length, tightness and discretionary powers as organizational principles for URCs**

There are different conceptualizations of the notion of *arm's length*. This contribution is inspired by Pollitt et al. (2004) who studied agencies in various countries. We emphatically say *inspired* since the positions of agencies they studied, being autonomized from their parent organizations (typically a ministry), are not quite the same as those of PPPs like URCs.<sup>1</sup> In their research on agencies, Pollitt et al. (2004) distinguish between two dimensions of arm's length: disaggregation and autonomization. Disaggregation can be defined as the degree of structural separation of an organization from its parent organization, i.e.: to what extent is the organization independent? It seems to relate to the 'independence cluster of administrative DNA' (Hood and Jackson, 1991). For this research, we focus on the relation between the URC and the city council plus elected officeholders. Since the arm's length discussion in PPPs mainly focuses on these separations (Skelcher, 2005), we looked at the way in which political entities control the partnership.

Disaggregation does not, however, imply that an organization is entirely free to make its own choices. Autonomization can be defined as the degree to which the organization has *discretionary powers* regarding inter alia the use of its financial resources, organizational structure, and project plans (cf. Verhoest et al., 2004b). Autonomization relates to the 'decision-making cluster of administrative DNA' (Hood and Jackson, 1991). For this study, we especially focus on the way the URC can make its own decisions independently from the various organizations that are its constituents.

The *tightness* of the organization is a third feature. URC structures range widely from tightly organized consortia to more informal arrangements like project groups lacking judicial status. Discussions on the optimal organizational form abound in both PPP literature and government texts on PPPs (Klijn, 2010; NAO, 2001). However, these literatures lack agreement about which organizational form best suits PPPs. Whilst the PFI literature suggests that tight contracts binding public and private actors closely together are best, the literature that focuses on URCs suggests that tight partnerships established to operate at arm's length are the superior form (VROM-Raad, 2002). Considering the above-discussed theoretical perspectives of resource-dependency and neo-institutional theory, it may be expected that more tightly organized partnerships generate better results (Benson, 1982; Negandhi, 1975). In sum, the theoretical arguments suggest that PPPs will be more effective when [1] the level of disaggregation is larger (more at arm's length), [2] they have more discretionary power, and [3] they are more tightly organized.

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<sup>1</sup> An agency has one parent organization; in a PPP all the partners are parents.



## **2.2. PPPs: theoretical arguments in favor of management**

From a governance perspective, a PPP is a complex process involving public and private actors (who may have organized themselves in a separate organization), and a whole network of actors which have interests in the issues at hand. This is particularly true for spatial planning processes ([Klijn et al., 2006](#)). The governance literature stresses the importance of horizontal coordination between public and other actors, and the difficulty of reverting to top down steering (Pierre, 1997). Most of the literature stresses that active forms of network management are crucial to achieve outcomes ([Agranoff and McGuire, 2001](#); [Keast and Mandell, 2014](#); [Mandell, 2001](#)). Network management is mostly defined as the deliberate attempts to facilitate and guide interactions between actors in the network ([Koppenjan and Klijn, 2004](#)). We conceptualize network management as a number of strategies to facilitate cooperation, explore (new) contents and arrange actors in the process (see [Klijn et al., 2010](#)). Empirical evidence clearly indicates that network management is positively related to network performance (see e.g. [Meier and O'Toole, 2007](#); [Provan et al., 2009](#); [Klijn et al., 2010](#); [Verweij et al., 2013](#)). It is aimed at inter alia promoting public-private cooperation, the generation of new innovative solutions by pooling knowledge, and reducing veto powers and obstruction ([Agranoff and McGuire, 2001](#); [Koppenjan and Klijn, 2004](#); [McGuire and Agranoff, 2011](#); [Sørensen and Torfing, 2007](#)).

This perspective has also permeated the PPP literature. For instance, it is assumed that public-private co-production results in intensified information exchanges and pooling of knowledge, and by doing so generates more innovative and higher quality products and policy outputs for complex societal problems (e.g. [Edelenbos and Teisman, 2008](#)). But it is also assumed that PPP projects take place in a larger network of actors who are affected by the PPP project and try to influence it ([Steijn et al., 2011](#); [Hodge et al., 2010](#)). Although the governance literature does acknowledge the importance of organizational structure and form ([Mandell, 2001](#)), it tends to stress institutional and especially managerial characteristics for being decisive to achieving good outcomes. Such efforts are coined network management ([Agranoff and McGuire, 2001](#); [Gage and Mandell, 1990](#); [Koppenjan and Klijn, 2004](#); [Meier and O'Toole, 2007](#)).

In sum, the governance literature stresses that it are network management strategies that actually make the difference and are responsible for achieving good results in PPPs.

## **2.3. Beyond the dichotomy**

Considering the various arguments as to what produces good outcomes in PPPs, different groups of arguments originating from different theoretical perspectives can be identified. These could be captured in a dichotomous question (cf. [Kort and Klijn, 2011](#); [Steijn et al., 2011](#)). What is the key to successful PPPs: the form and monitoring of the partnerships (the assumption implicit in NPM types of arguments) or network management activities aimed at closer cooperation?

Such a dichotomy can be analytically valuable. However, successful PPPs may not be due to either form or management strategies. Instead, they could very well combine to produce good outcomes. In the next section we introduce fsQCA – a relatively new approach to researching the planning, management and governance of spatial (PPP) projects (cf. [Verweij et al., 2013](#); [Verweij and Gerrits, 2015](#); [Verweij, 2015](#)) – to explore how. Thus, in this article we want to explore the assumption that it are combinations that really generate good outcomes in PPP projects.

### 3. Methodological framework

In Section 3.1 we briefly explain the main features of fsQCA. In Section 3.2 we present the operationalization and survey data. Section 3.3 concerns the calibration into fuzzy set data.

#### 3.1. Fuzzy set QCA

Fuzzy set qualitative comparative analysis (fsQCA) can be used for analyzing combinations of conditions (i.e. configurations) in a systematized manner (Ragin, 2008a). Moreover, fsQCA can be usefully applied to an intermediate number of cases, e.g. between 10 and 100 (Rihoux et al., 2009).

In fsQCA, conditions (including the outcome) are perceived as sets, and cases can have degrees of membership in a set anywhere between 0 and 1. Conditions are not to be confused with variables. Whereas variables are “adversaries in the struggle to explain variation in dependent variables (...) [conditions are] potential collaborators in the production of outcomes” (Ragin, 2008a, page 113-114). Causality in fsQCA is expressed in terms of necessity and sufficiency. Basically, a condition is necessary if an outcome cannot be produced without it. A condition is sufficient if its presence always produces the outcome (but the outcome may also occur without the condition). These conditions can combine in various ways. Thus, causality in fsQCA is configurational (combinations of conditions produce the outcome), equifinal (different combinations may produce the outcome) and multifinal (a condition can play a different role in different configurations) (Grofman and Schneider, 2009).

Four basic elements of conducting fsQCA are data tables, truth tables, solution formulas and parameters of fit (Grofman and Schneider, 2009). The data table (or *raw data matrix*) should be published along with the analysis (Schneider and Wagemann, 2010) and is, hence, included as Appendix C. Each row presents a case (here: the scores of an individual manager of an URC on an item) and the columns present the different conditions including the outcome. The *truth table* is the key tool for the analysis. It lists all the logically possible configurations and sorts the cases accordingly (Ragin, 2008a). The table consists of  $2^k$  logically possible configurations, where  $k$  represents the number of conditions that is included in the analysis. Each of the combinations is assessed as to whether it is sufficient for the outcome to occur or not.<sup>2</sup> Using fs/QCA software (Ragin and Davey, 2009), those configurations that are

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<sup>2</sup> Truth tables are used to analyze sufficiency. Necessity requires a separate analysis.



identified as being sufficient are subsequently minimized using Boolean algebra resulting in different *solution formulas* (Schneider and Wagemann 2010, 2012).<sup>3</sup> These analytical results are subsequently assessed for their fit with the underlying data using two measures: consistency and thereafter coverage (Ragin, 2008a; Schneider and Wagemann, 2010; 2012). The degree to which the empirical evidence supports the necessity and/or sufficiency of set-theoretic relations found through the analysis is expressed in terms of consistency. The way in which cases are distributed over these configurations is expressed in terms of coverage (Rihoux and Ragin, 2009).

### 3.2. Operationalization and survey data

The internet survey was held between November 2006 and January 2007. The respondents were managers involved in Dutch urban regeneration partnerships present at that time. An extensive search was conducted to acquire a representative list of managers involved in Dutch URCs. Once the list was constructed, projects not aimed at physical regeneration were excluded. The remaining projects were all clearly aimed at urban regeneration, showed observable signs of public-private cooperation, and had organizational arrangements in place to guide the public-private interactions. The projects included physical restructuring, and sometimes additionally various socioeconomic interventions (see Kort, 2011, page 77-80). Of the 210 individuals approached, 68 responded positively (approximately one third). Each respondent is a case in the analysis. Because 18 respondents failed to fully complete the survey, 50 cases are included in the present analysis.

Organizational form comprises three conditions: *functioning at arm's length*, *discretionary powers* and *tightness*, comprising respectively 8, 7 and 9 items. The fourth condition, *management*, consists of 16 items.<sup>4</sup> The outcome condition comprises 6 items. The operationalization of the conditions is depicted in Appendices A and B. A five-point Likert scale (1 to 5) was used for all items. Appendix C provides the raw survey data. It shows the sum of the item scores ( $S_{\text{raw}}$ ) for each condition per respondent.

### 3.3. Calibration from variable scores to fuzzy sets

Ragin (2008a, 2009) explains that interval and ratio scales need to be calibrated, using substantive and theoretical knowledge, to be able to determine the membership degrees of cases in a set. In this article, we use a continuous fuzzy set scale (Ragin, 2009) since this transforms the survey data as little as possible. The three qualitative anchor points are full membership (1.000), full non-membership (0.000) and maximum ambiguity or crossover point (0.500). Determining the crossover point

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<sup>3</sup> There are three kinds of solution formulas: complex, intermediate and parsimonious.

<sup>4</sup> Since we are interested in the relation between the application of management strategies and outcomes we proceed with an aggregate management condition (cf. Kort and Klijn, 2011) consisting of four dimensions – *arranging*, *exploring content*, *connecting/coordinating* and *committing* – with four items each.

( $S_{\text{cross}}$ ) requires some extra explanation. A previous analysis with earlier survey data, using the same items, has shown that managers tend to value outcomes ( $O_c$ ) slightly higher than non-managers (Klijn et al., 2010). As shown in Table 1, we thus used the crossover point of 24 for the outcomes instead of middle (which is 18).<sup>5</sup> This corresponds with an average score of 4 on the five-point Likert scale instead of the middle score 3 on each of the items. We think this is a logical choice since this is the score where a respondent really indicates that the outcome is positive while the middle score 3 does not. For the organizational conditions ( $F_{1-3}$ ) we set the crossover points at the score which lies in the middle.<sup>6</sup>

For the condition management (M) a more complex calibration was performed. We stayed with the original approach used in previous analyses as this proved the most viable one (Kort, 2011). Respondent scores of 1-3 and 4-5 on the Likert scale were transformed into a 0 and 1 respectively. This means that we only coded a certain managerial strategy (that is one of the 16 items) as 'present' when the respondent chooses for the score 4 or higher. Since this is actually the first positive score (3 is a neutral score or 'maximum ambiguity' in terms of QCA), this is a logical choice which also takes into account possible bias of the managers that may tend to overstate their managerial activities.<sup>7</sup> The logically possible minimum total item score ( $S_{\text{min}}$ ) for a respondent for M is thus 0 and the logically possible maximum score ( $S_{\text{max}}$ ) is 16. The crossover point lies in the middle at 8.<sup>8</sup> Table 1 summarizes our choices.

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<sup>5</sup> A crossover point of 24 would result in all cases with a score of 24 being excluded from the analysis since fsQCA cannot deal with so-called 'maximum ambiguity' in minimization procedures. Since a score of 24 is considered to present inclusion in the set  $O_c$ , the crossover point is actually set at 23.9.

<sup>6</sup> Crossover points of 24, 21 and 27 respectively would result in all cases with these scores on the respective conditions being excluded from the analysis as fsQCA cannot deal with so-called 'maximum ambiguity' in minimization procedures. Since scores of 24, 21 and 27 respectively are considered to present exclusion in the sets  $F_1$ ,  $F_2$  and  $F_3$ , the crossover points are actually set at 24.1, 21.1 and 27.1.

<sup>7</sup> This bias seems to be present when we looked at the summed item scores because a crossover point in the middle (which is 48) results in 3 cases under and 47 cases over the crossover point.

<sup>8</sup> As the lower range (0-7) is empirically smaller (scores of 0 and 1 are not present) than the upper range (9-16) (only a score of 16 is not present), the crossover point was set at 8.1, since fsQCA cannot deal with so-called 'maximum ambiguity' in minimization procedures.

Table 1: calibration rules for transforming raw data into continuous fuzzy sets

| Condition                      | Number of items | Minimum score ( $S_{min}$ ) = full non membership (0.000) | Maximum score ( $S_{max}$ ) = full membership (1.000) | Crossover point ( $S_{cross}$ ) (0.500) |
|--------------------------------|-----------------|---|---|---|
| Organization (F)               |                 |   |   |   |
| Arm's length ( $F_1$ )         | 8               | 8   | 40  | 24.1                                    |
| Discretionary powers ( $F_2$ ) | 7               | 7   | 35  | 21.1                                    |
| Tightness ( $F_3$ )            | 9               | 9   | 45  | 27.1                                    |
|                                |                 |   |   |   |
| Management total (M)           | 16              | 0   | 16  | 8.1                                     |
|                                |                 |   |   |   |
| Outcomes ( $O_c$ )             | 6               | 6   | 30  | 23.9                                    |
|                                |                 |   |   |   |

Based on qualitative anchor points as defined in Table 1 ( $S_{min}$ ,  $S_{max}$  and  $S_{cross}$ ), the raw data ( $S_{raw}$ ) as provided in Appendix C are transformed to the fuzzy set scores ( $S_{fuzz}$ ) of Appendix D. The calibration formula is provided in a footnote.<sup>9</sup>

#### 4. Results of fuzzy set analysis

In this paragraph the results of the analysis of the fuzzy set data matrix (Appendix D) are presented. First, a distinction is made between cases which have an  $O_c$  above the cross-over point and those that have an  $O_c$  below the  $S_{cross}$ . This is done in Table 2.

Table 2:  $O_c$  per case

| $O_c$ | # cases | Cases   |
|-------|---------|---|
| 0     | 22      | $R_1, R_3, R_6, R_9, R_{10}, R_{13}, R_{14}, R_{16}, R_{18}, R_{21}, R_{23}, R_{26}, R_{31}, R_{34}, R_{35}, R_{36}, R_{37}, R_{38}, R_{42}, R_{44}, R_{49}, R_{50}$  |
| 1     | 28      | $R_2, R_4, R_5, R_7, R_8, R_{11}, R_{12}, R_{15}, R_{17}, R_{19}, R_{20}, R_{22}, R_{24}, R_{25}, R_{27}, R_{28}, R_{29}, R_{30}, R_{32}, R_{33}, R_{39}, R_{40}, R_{41}, R_{43}, R_{45}, R_{46}, R_{47}, R_{48}$ |

The next step is to construct the truth table, which is shown as Table 3. The first four columns represent the logically possible configurations present in the data. The 13 rows show that not all of the 16 ( $2^4=16$ ) logically possible configurations are actually present. The sixth and seventh columns display the cases related to these configurations.

<sup>9</sup> The  $S_{raw}$  width associated with 'one unit' of  $S_{fuzz}$  differs above and below the  $S_{cross}$  since the  $S_{cross}$  is not necessarily associated with the median of the raw data scores for a condition. Therefore, two separate formulas were developed. If  $S_{raw} < S_{cross}$ , then  $S_{fuzz} = (S_{raw} - S_{min}) \times [0.5 / (S_{cross} - S_{min})]$ . If  $S_{raw} > S_{cross}$ , then  $S_{fuzz} = 0.5 + \{(S_{raw} - S_{cross}) \times [0.5 / (S_{max} - S_{cross})]\}$ .

Table 3: truth table<sup>10</sup>

| <b>F<sub>1</sub></b> | <b>F<sub>2</sub></b> | <b>F<sub>3</sub></b> | <b>M</b> | <b>Number of cases</b> | <b>Sufficient for O<sub>c</sub></b> | <b>Cases</b>   | <b>Raw consistency</b> | <b>PRI consistency</b> | <b>Product ▼</b> |
|----------------------|----------------------|----------------------|----------|------------------------|-------------------------------------|--|------------------------|------------------------|------------------|
| 1                    | 0                    | 1                    | 1        | 2                      | 1                                   | R <sub>39</sub> , R <sub>45</sub>  | 0.996575               | 0.904002               | 0.900906         |
| 0                    | 1                    | 1                    | 1        | 8                      | 1                                   | R <sub>13</sub> , R <sub>17</sub> , R <sub>18</sub> , R <sub>20</sub> , R <sub>23</sub> , R <sub>29</sub> , R <sub>37</sub> , R <sub>43</sub>  | 0.983398               | 0.858956               | 0.844696         |
| 0                    | 1                    | 0                    | 0        | 1                      | 1                                   | R <sub>38</sub>  | 0.995010               | 0.839077               | 0.834890         |
| 1                    | 1                    | 0                    | 1        | 3                      | 1                                   | R <sub>22</sub> , R <sub>30</sub> , R <sub>35</sub>  | 0.989427               | 0.825505               | 0.816776         |
| 1                    | 1                    | 1                    | 1        | 15                     | 0                                   | R <sub>4</sub> , R <sub>5</sub> , R <sub>8</sub> , R <sub>11</sub> , R <sub>14</sub> , R <sub>16</sub> , R <sub>19</sub> , R <sub>25</sub> , R <sub>27</sub> , R <sub>32</sub> , R <sub>36</sub> , R <sub>40</sub> , R <sub>46</sub> , R <sub>47</sub> , R <sub>48</sub> | 0.933111               | 0.669940               | 0.625129         |
| 1                    | 1                    | 1                    | 0        | 7                      | 0                                   | R <sub>10</sub> , R <sub>12</sub> , R <sub>15</sub> , R <sub>24</sub> , R <sub>28</sub> , R <sub>41</sub> , R <sub>44</sub>  | 0.958134               | 0.632165               | 0.605699         |
| 0                    | 1                    | 1                    | 0        | 1                      | 0                                   | R <sub>6</sub>   | 0.979318               | 0.616644               | 0.603890         |
| 1                    | 1                    | 0                    | 0        | 2                      | 0                                   | R <sub>1</sub> , R <sub>31</sub>   | 0.979089               | 0.547620               | 0.536169         |
| 1                    | 0                    | 0                    | 0        | 2                      | 0                                   | R <sub>7</sub> , R <sub>50</sub>   | 0.987747               | 0.427998               | 0.422754         |
| 0                    | 0                    | 0                    | 0        | 1                      | 0                                   | R <sub>3</sub>   | 0.988151               | 0.380530               | 0.376021         |
| 1                    | 0                    | 1                    | 0        | 2                      | 0                                   | R <sub>34</sub> , R <sub>42</sub>  | 0.974517               | 0.373830               | 0.364303         |
| 0                    | 0                    | 1                    | 0        | 4                      | 0                                   | R <sub>9</sub> , R <sub>21</sub> , R <sub>26</sub> , R <sub>33</sub>   | 0.981108               | 0.316800               | 0.310815         |
| 1                    | 0                    | 0                    | 1        | 2                      | 0                                   | R <sub>2</sub> , R <sub>49</sub>   | 0.978317               | 0.297588               | 0.291136         |

<sup>10</sup> *Raw consistency* expresses the consistency of a single truth table row. However, in fsQCA a condition can be both a subset of the outcome (O<sub>c</sub>) and its negation (~O<sub>c</sub>) (Schneider and Wagemann, 2012). Without going into the technical details, this can result in high raw consistency scores as we can see in Table 2. *PRI* consistency stands for Proportional Reduction in Inconsistency. This expresses how much it helps to know that a given condition is a subset of the outcome. If PRI yields a low score, then the consistency score for both O<sub>c</sub> and its negation (~O<sub>c</sub>) are very close to each other. The PRI can be multiplied with the raw consistency score which yield the *PRODUCT* score. Basically, a low *PRODUCT* score means that a condition is not sufficient for the outcome (Schneider and Wagemann, 2012).

The truth table was analyzed with the fuzzy set truth table algorithm.<sup>11</sup> First we have to decide which configurations to include in the analysis of sufficiency. Two generally accepted rules are used: consistency and frequency (Ragin, 2008a; 2008b; Schneider and Wagemann, 2012). Having examined the PRODUCT scores in Table 3, we decided to set the consistency cutoff point at 0.816776 since this indicates a clear gap (cf. Vis, 2009). This score is considered as acceptable in the literature (Schneider and Wagemann, 2012). As a result, configurations that do not meet this value (or that have a fuzzy outcome value lower than 0.50000) are indicated with a ‘0’ in the ‘sufficient for  $O_c$ ’ column (Table 3) and are excluded from the minimization procedure. The first four configurations meet the consistency criterion and are assigned a ‘1’ in that column. Ragin (2008a, 2008b) explains that when the number of cases is relatively small a frequency threshold of about 1 or 2 should be used. Since we have an intermediate number of cases (50) we have set the threshold at 2. This means that this leaves us with three configurations for the analysis (the first, second and fourth row of Table 3). The results of the analysis are depicted in Table 4. Note that although scores are presented as zeroes and ones in the truth table, the underlying data used in the analysis are the original fuzzy scores (see Appendix D). Since our research question aims at identifying combinations of organizational form and management towards good outcomes, we have only considered the complex solution in our analysis which means that no simplifying assumptions were made.

*Table 4: complex solution for  $O_c$*

|                             | <b>Path 1</b>              | <b>Path 2</b>              | <b>Path 3</b>              |
|-----------------------------|----------------------------|----------------------------|----------------------------|
|                             | $F_1 * F_2 * \sim F_3 * M$ | $F_1 * \sim F_2 * F_3 * M$ | $\sim F_1 * F_2 * F_3 * M$ |
| Raw coverage                | 0.455                      | 0.522                      | 0.640                      |
| Unique coverage             | 0.027                      | 0.057                      | 0.156                      |
| Consistency                 | 0.989                      | 0.997                      | 0.983                      |
|                             |                            |                            |                            |
| <i>Solution coverage</i>    | 0.735                      |                            |                            |
| <i>Solution consistency</i> | 0.977                      |                            |                            |

## 5. Conclusions and discussion

In this article we set out to explore which organizational characteristics and management conditions combine to produce good outcomes in PPPs. Moreover, the aim was to refine earlier regression analyses performed on the same data, which found that managerial strategies are highly relevant for producing good outcomes while organizational characteristics are not (Kort and Klijn, 2011). Before interpreting the results and drawing conclusions, we first reflect on the method and the limitations of the study.

<sup>11</sup> A preceding analysis for necessary conditions revealed that there are no necessary conditions. Given the raw consistency scores, we took a conservative approach. For  $O_c$  the necessity test revealed:  $F_1$  (con. 0.903, cov. 0.840);  $F_2$  (con. 0.918, cov. 0.781);  $F_3$  (con. 0.948, cov. 0.754);  $M$  (con. 0.887, cov. 0.815).

## 5.1. Reflection on the method and analysis

Considering respondents as cases in fsQCA implies that we take single observations as reliable measures of some reality (e.g. the PPP in which a respondent is involved). As a result, small ‘measurement errors’ such as respondent biases may have an impact in minimalizing the causal statements presented in a truth table, especially when many cases are on (or just over) the crossover point (which expresses maximum ambiguity). Note, however, that although this may significantly change the picture provided by the first row in Table 4 (i.e. the paths), the ‘parameters of fit’ scores are more robust because a configuration can be interpreted as “sufficient if, *across all cases*, set membership in it is smaller than or equal to each case’s membership in the outcome” (Schneider and Wagemann, 2012, page 333, italics added). This means that consistency scores for paths are based upon all cases present in the truth table.

As stressed by many authors (e.g. [Berg-Schlosser et al., 2009](#); [Rihoux, 2003](#); [Ragin, 1987](#); [2000](#); [2008a](#); [Schneider and Wagemann, 2012](#)), QCA is first and foremost a research approach that facilitates dialogue between ideas and evidence. Using survey data makes this harder (cf. [Cooper and Glaesser, 2012](#)). This is reflected in the rather mechanical calibration process in this article. First, it is difficult to include additional information (e.g. interviews and observations) to assess membership scores of respondents as cases in sets, which may provide a solid basis for scoring cases. Second, it is difficult to engage with individuals (Rihoux et al., 2009) and reach the desired level of intimacy with each case. Third, strategies to encounter contradictory rows and limited diversity – such as adding/dropping cases, recalibrating conditions, and adding/dropping conditions – in the process of calibrating survey data into fuzzy scores are more difficult to use.

These limitations are reflected in the results of the analysis. As can be seen from Tables 3 and 4, the three paths resulting from the analysis are actually no minimizations at all, i.e. they are equal to the three configurations in Table 3 with a positive score on the outcome (and with more than one case). Nothing is gained with the truth table minimization. Given the nature of the data, however, we opted for a conservative approach and did not work with counterfactual analyses which would produce more parsimonious results. Despite this limitation, the results are valid sufficient configurations nevertheless, indicated by the high consistency and PRODUCT scores.

Notwithstanding the important issues mentioned above, it is understood that survey data may be used to perform fsQCA (e.g. [Cooper and Glaesser, 2012](#); cf. [Schneider and Wagemann, 2010](#)), and we further explored this option in the present article. For our research, fsQCA helped us to refine the research findings in identifying multiple combinations of conditions that are sufficient for producing good outcomes. However, researchers have to be aware of and transparent about these methodological issues, as we did above. [Cooper and Glaesser \(2012\)](#) and [Schneider and Wagemann \(2010\)](#) suggest that the impossibility of in-depth case knowledge in our analysis may be somewhat supplemented with interpretation of the patterns based on theory. Hence, we connected the findings to earlier research and theoretical



discussions on PPP, which are inter alia supported by insights from previous in-depth case study research (cf. [Kort, 2011](#)). Although this does not solve the limitations as mentioned above, it may relieve them somewhat.

## 5.2. Conclusions

The analysis identified three combinations of organizational form and management that can be said to produce good outcomes in PPPs in urban regeneration projects. The *first path* states that organizations at arm's length, with more discretionary powers, that are loosely tight, and that employ many network management strategies produce good outcomes in PPPs. The *second path* states that organizations at arm's length, with few discretionary powers, that are tightly organized, and that employ many network management strategies produce good outcomes in PPPs. The *third path* states that organizations not at arm's length, with more discretionary powers, that are tightly organized, and that employ many network management strategies produce good outcomes in PPPs. What these results reveal, first, is that the employment of network management strategies matters to produce good outcomes in PPPs (cf. [Kort and Klijn, 2011](#)). Second, the analysis shows that organizational form matters as well, since no path is without any F conditions (cf. [Kort and Klijn, 2011](#)). However, not all organizational conditions are required at the same time to achieve good outcomes.

The main conclusion that can be drawn from the fsQCA is that combinations of conditions matter. Producing good outcomes in public-private partnerships is, according to experts (i.e. our survey respondents) in the field of urban regeneration, not a matter of 'either/or', but a matter of 'and/and': correctly combining organizational form and network management strategies is what tips the balance. The results of the analysis presented in this contribution thus indeed provided a refinement.

Based on the results, it can be concluded that all three organizational conditions do contribute to good outcomes. In that sense, the fsQCA shows something extra compared to the earlier research, where the contribution of organizational conditions was not significant ([Kort and Klijn, 2011](#)). This may not be surprising though, since the research approaches are designed to address different questions ([Grofman and Schneider 2009](#); [Vis 2012](#)). However, the results indicate that fsQCA and regression analysis can be complementary (and not contradictory): in both approaches network management is centrally important. And when correctly combined with organizational strategies, its value may be even higher for achieving good outcomes in PPPs. Put differently, installing the correct organizational features is important, but this cannot be relied upon without active network management.

## Appendices

### *Appendix A: operationalization of organizational form (adapted from Kort and Klijn, 2011)*

| <i>Items</i> | <i>Arm's length (F<sub>1</sub>)</i>  | <i>Discretionary powers (F<sub>2</sub>)</i>   | <i>Tightness (F<sub>3</sub>)</i>   |
|--------------|--|---|--|
|              |  | To what extent does the joint organization have the power to make decisions on its own about: | To what degree the following activities are undertaken or performed together in the URC: |
| 1            | A clear framework was set by the city council that determined the ranges of freedom for the URC.     | Doing research (e.g. financial feasibility studies).  | The sharing of knowledge between cooperating actors.                                     |
| 2            | Control over the project by the city council was tight.  | The definition of the physical program.   | The sharing of costs for research or an architect.                                       |
| 3            | The city council wants to be informed frequently on the progress of the project.                     | The definition of the social and/or economic program.   | The sharing of investments (e.g. buying land and properties).                            |
| 4            | The city council wants to be informed only when the project steps outside the defined framework.     | The acquisition of land and property.   | The sharing of financial risks.  |
| 5            | A clear framework was set up by the city directorate that determined range of freedom for the URC.   | Interaction with and organizing input of stakeholders.  | The cooperation in formulating visions and plans.  |
| 6            | Control over the project by the city directorate was tight.  | The closing of contracts with (private) parties for realization.                              | The cooperation in doing research.   |
| 7            | The city directorate wants to be informed frequently on the progress of the project.                 | The realization of the project.   | Joint selection of parties for the realization phase.                                    |
| 8            | The city directorate wants to be informed only when the project steps outside the defined framework. |   | The cooperation in governmental consultations.   |
| 9            |  |   | The cooperation in stakeholder consultations.  |

*Appendix B: operationalization of management and content (adapted from Kort and Klijn, 2011)*

|   |  |
|---|--|
| Arranging (M <sub>1</sub> )               | The relevant public parties are involved through organized forms of consultation.  |
|   | The relevant private parties are involved through organized forms of consultation.   |
|   | The relevant social parties are involved through organized forms of consultation.  |
|   | In the different phases of the project, connections with new parties are sought.   |
| Exploring content (M <sub>2</sub> )       | The decision-making process is enriched by the involvement of different opinions.  |
|   | In this project, sufficient attention is paid to the mutual exchange of information.   |
|   | In the information gathering process, the development and determination of mutual standing points are emphasized.                          |
|   | The project emphasizes the (external) generation of new ideas and innovative solutions.  |
| Connecting/coordinating (M <sub>3</sub> ) | Sufficient attention is paid to communication between the various parties involved in the project.   |
|   | In this project, emphasis is placed on making choices together so that the direction of the project is recognized by the parties involved. |
|   | In this project, sufficient attention is paid to the basis and development of actor and personal relationships.                            |
|   | In times of conflict during the project, emphasis is placed on bringing together conflicting interests.                                    |
| Committing (M <sub>4</sub> )              | Parties are bound to each other by making arrangements and keeping each other to those arrangements.                                       |
|   | Parties must sometimes incur losses because of their commitment to the project.  |
|   | Agreements are flexible in order to be able to deviate if required.  |
|   | Exit strategies are available if required to protect the interests of actors.  |
| Content (O <sub>c</sub> )                 | The proposals are innovative.  |
|   | My organization had enough input in the proposals.   |
|   | Spatial functions are related in the right way.  |
|   | The proposals really tackle the problems in the area.  |
|   | The proposals are realistic and financially feasible.  |
|   | The proposals are future proof and sustainable.  |

Appendix C: raw data matrix

| Respondent (R <sub>i</sub> ) | Organizational form (F)        |  |                             | Total management (M) | Content (O <sub>c</sub> ) |
|------------------------------|--------------------------------|--|-----------------------------|----------------------|---------------------------|
|                              | Arm's length (F <sub>1</sub> ) | Discretionary powers (F <sub>2</sub> ) | Tightness (F <sub>3</sub> ) |                      |                           |
| 1                            | 29                             | 23                                     | 20                          | 8                    | 22                        |
| 2                            | 25                             | 11                                     | 24                          | 11                   | 24                        |
| 3                            | 20                             | 15                                     | 20                          | 8                    | 23                        |
| 4                            | 33                             | 34                                     | 40                          | 15                   | 27                        |
| 5                            | 34                             | 27                                     | 38                          | 10                   | 28                        |
| 6                            | 23                             | 31                                     | 40                          | 5                    | 20                        |
| 7                            | 26                             | 18                                     | 24                          | 8                    | 24                        |
| 8                            | 26                             | 34                                     | 43                          | 11                   | 26                        |
| 9                            | 24                             | 21                                     | 32                          | 5                    | 21                        |
| 10                           | 26                             | 27                                     | 30                          | 6                    | 20                        |
| 11                           | 29                             | 25                                     | 35                          | 12                   | 24                        |
| 12                           | 25                             | 32                                     | 37                          | 7                    | 24                        |
| 13                           | 24                             | 28                                     | 37                          | 9                    | 23                        |
| 14                           | 30                             | 28                                     | 36                          | 12                   | 22                        |
| 15                           | 29                             | 29                                     | 43                          | 6                    | 26                        |
| 16                           | 26                             | 28                                     | 36                          | 11                   | 21                        |
| 17                           | 22                             | 22                                     | 34                          | 11                   | 24                        |
| 18                           | 24                             | 28                                     | 36                          | 12                   | 23                        |
| 19                           | 27                             | 28                                     | 44                          | 13                   | 24                        |
| 20                           | 18                             | 35                                     | 42                          | 15                   | 30                        |
| 21                           | 16                             | 15                                     | 30                          | 7                    | 23                        |
| 22                           | 25                             | 26                                     | 27                          | 13                   | 25                        |
| 23                           | 18                             | 24                                     | 29                          | 11                   | 23                        |
| 24                           | 31                             | 31                                     | 41                          | 5                    | 24                        |
| 25                           | 27                             | 25                                     | 43                          | 10                   | 24                        |
| 26                           | 21                             | 21                                     | 28                          | 7                    | 23                        |
| 27                           | 31                             | 25                                     | 29                          | 10                   | 24                        |
| 28                           | 30                             | 27                                     | 42                          | 8                    | 25                        |
| 29                           | 24                             | 32                                     | 34                          | 11                   | 28                        |
| 30                           | 37                             | 31                                     | 26                          | 12                   | 26                        |
| 31                           | 29                             | 26                                     | 23                          | 4                    | 23                        |
| 32                           | 29                             | 28                                     | 37                          | 12                   | 24                        |
| 33                           | 20                             | 16                                     | 28                          | 3                    | 24                        |
| 34                           | 28                             | 12                                     | 32                          | 5                    | 22                        |
| 35                           | 32                             | 24                                     | 25                          | 11                   | 23                        |
| 36                           | 27                             | 28                                     | 36                          | 10                   | 21                        |
| 37                           | 20                             | 23                                     | 30                          | 9                    | 22                        |
| 38                           | 24                             | 23                                     | 22                          | 5                    | 23                        |
| 39                           | 28                             | 18                                     | 28                          | 13                   | 24                        |
| 40                           | 30                             | 34                                     | 42                          | 12                   | 24                        |
| 41                           | 27                             | 28                                     | 45                          | 8                    | 27                        |
| 42                           | 25                             | 20                                     | 29                          | 2                    | 22                        |
| 43                           | 21                             | 24                                     | 35                          | 13                   | 26                        |
| 44                           | 31                             | 31                                     | 44                          | 6                    | 23                        |
| 45                           | 32                             | 20                                     | 36                          | 12                   | 24                        |

|    |    |    |    |    |    |
|----|----|----|----|----|----|
| 46 | 30 | 23 | 36 | 15 | 24 |
| 47 | 30 | 24 | 36 | 10 | 24 |
| 48 | 30 | 22 | 34 | 11 | 27 |
| 49 | 26 | 19 | 25 | 11 | 22 |
| 50 | 25 | 10 | 21 | 8  | 19 |

*Appendix D: fuzzy set data matrix*

| Respondent (R <sub>i</sub> ) | Organizational form (F)        |  |                             | Total management (M) | Content (O <sub>c</sub> ) |
|------------------------------|--------------------------------|--|-----------------------------|----------------------|---------------------------|
|                              | Arm's length (F <sub>1</sub> ) | Discretionary powers (F <sub>2</sub> ) | Tightness (F <sub>3</sub> ) |                      |                           |
| 1                            | 0,654                          | 0,568                                  | 0,304                       | 0,494                | 0,447                     |
| 2                            | 0,528                          | 0,142                                  | 0,414                       | 0,684                | 0,508                     |
| 3                            | 0,373                          | 0,284                                  | 0,304                       | 0,494                | 0,475                     |
| 4                            | 0,780                          | 0,964                                  | 0,860                       | 0,937                | 0,754                     |
| 5                            | 0,811                          | 0,712                                  | 0,804                       | 0,620                | 0,836                     |
| 6                            | 0,466                          | 0,856                                  | 0,860                       | 0,309                | 0,391                     |
| 7                            | 0,560                          | 0,390                                  | 0,414                       | 0,494                | 0,508                     |
| 8                            | 0,560                          | 0,964                                  | 0,944                       | 0,684                | 0,672                     |
| 9                            | 0,497                          | 0,496                                  | 0,637                       | 0,309                | 0,419                     |
| 10                           | 0,560                          | 0,712                                  | 0,581                       | 0,370                | 0,391                     |
| 11                           | 0,654                          | 0,640                                  | 0,721                       | 0,747                | 0,508                     |
| 12                           | 0,528                          | 0,892                                  | 0,777                       | 0,432                | 0,508                     |
| 13                           | 0,497                          | 0,748                                  | 0,777                       | 0,557                | 0,475                     |
| 14                           | 0,686                          | 0,748                                  | 0,749                       | 0,747                | 0,447                     |
| 15                           | 0,654                          | 0,784                                  | 0,944                       | 0,370                | 0,672                     |
| 16                           | 0,560                          | 0,748                                  | 0,749                       | 0,684                | 0,419                     |
| 17                           | 0,435                          | 0,532                                  | 0,693                       | 0,684                | 0,508                     |
| 18                           | 0,497                          | 0,748                                  | 0,749                       | 0,747                | 0,475                     |
| 19                           | 0,591                          | 0,748                                  | 0,972                       | 0,810                | 0,508                     |
| 20                           | 0,311                          | 1,000                                  | 0,916                       | 0,937                | 1,000                     |
| 21                           | 0,248                          | 0,284                                  | 0,581                       | 0,432                | 0,475                     |
| 22                           | 0,528                          | 0,676                                  | 0,497                       | 0,810                | 0,590                     |
| 23                           | 0,311                          | 0,604                                  | 0,553                       | 0,684                | 0,475                     |
| 24                           | 0,717                          | 0,856                                  | 0,888                       | 0,309                | 0,508                     |
| 25                           | 0,591                          | 0,640                                  | 0,944                       | 0,620                | 0,508                     |
| 26                           | 0,404                          | 0,496                                  | 0,525                       | 0,432                | 0,475                     |
| 27                           | 0,717                          | 0,640                                  | 0,553                       | 0,620                | 0,508                     |
| 28                           | 0,686                          | 0,712                                  | 0,916                       | 0,494                | 0,590                     |
| 29                           | 0,497                          | 0,892                                  | 0,693                       | 0,684                | 0,836                     |
| 30                           | 0,906                          | 0,856                                  | 0,470                       | 0,747                | 0,672                     |
| 31                           | 0,654                          | 0,676                                  | 0,387                       | 0,247                | 0,475                     |
| 32                           | 0,654                          | 0,748                                  | 0,777                       | 0,747                | 0,508                     |
| 33                           | 0,373                          | 0,319                                  | 0,525                       | 0,185                | 0,508                     |
| 34                           | 0,623                          | 0,177                                  | 0,637                       | 0,309                | 0,447                     |
| 35                           | 0,748                          | 0,604                                  | 0,442                       | 0,684                | 0,475                     |
| 36                           | 0,591                          | 0,748                                  | 0,749                       | 0,620                | 0,419                     |
| 37                           | 0,373                          | 0,568                                  | 0,581                       | 0,557                | 0,447                     |
| 38                           | 0,497                          | 0,568                                  | 0,359                       | 0,309                | 0,475                     |

|    |       |       |       |       |       |
|----|-------|-------|-------|-------|-------|
| 39 | 0,623 | 0,390 | 0,525 | 0,810 | 0,508 |
| 40 | 0,686 | 0,964 | 0,916 | 0,747 | 0,508 |
| 41 | 0,591 | 0,748 | 1,000 | 0,494 | 0,754 |
| 42 | 0,528 | 0,461 | 0,553 | 0,123 | 0,447 |
| 43 | 0,404 | 0,604 | 0,721 | 0,810 | 0,672 |
| 44 | 0,717 | 0,856 | 0,972 | 0,370 | 0,475 |
| 45 | 0,748 | 0,461 | 0,749 | 0,747 | 0,508 |
| 46 | 0,686 | 0,568 | 0,749 | 0,937 | 0,508 |
| 47 | 0,686 | 0,604 | 0,749 | 0,620 | 0,508 |
| 48 | 0,686 | 0,532 | 0,693 | 0,684 | 0,754 |
| 49 | 0,560 | 0,426 | 0,442 | 0,684 | 0,447 |
| 50 | 0,528 | 0,106 | 0,331 | 0,494 | 0,363 |

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