

Explaining Successful Information Management In Small Business. Research project and thesis summary.

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ABSTRACT

This paper seeks to explain successful information management in small business. It explicitly uses critical realist theory, inductive, grounded methodology with cross-case comparison and qualitative comparative analysis (QCA) methods. The paper draws on critical realist ideas of Bhaskar, Sayer and Archer and their practical application by Pawson and Tilley; QCA methods come from Ragin, Cronqvist and others in the COMPASSS community.

The small businesses studied were chosen using a grounded definition of 'information intensity'. Success was based on the respondents' assessment of 'systems in use' rather than prescriptive 'systems as such' or business benefits based on traditional theories of the firm. A balanced definition of 'information management' is used rather than previous work from both positivist (information technology) and interpretivist (information systems) schools.

Research was based on grounded methodologies and consisted of five phases of theory development, refinement and testing using successful and unsuccessful cases in twelve organisations. At each phase different QCA techniques bridged the qualitative / quantitative divide through a synthetic approach that uses qualitative variables but formalised processing.

The research eventually identified six key basic-level causal conditions and showed how they combine to work together in causal groups to produce successful and unsuccessful outcomes. The findings also stress the importance of proximity and time to help reduce complexity and introduce the useful concepts of necessity and sufficiency to a wider audience. Of lesser importance is the confirmation that grounded definitions of success and behavioural definitions of information management are more relevant to the small business sector.

Method development was a secondary research objective and findings here included possible upward conflation from a QCA research community locked into remote macrosocial issues, structural elaboration / reproduction, adding ontological depth to empirical findings and reaching dualist compromises without recourse to relativism.

The research provides a fresh and innovative addition to both small business and information management literature. The cases remain intrinsic rather than instrumental so the next phase of the research will be to conduct one case study in significant depth using a retroductive research strategy to develop critical realist ideas further.

Key Words: information management, critical realism, QCA, retroduction.

RESEARCH DESIGN

Small businesses form a vital part of the UK economy and one of the key determinants of their ability to compete is their effective use of information (DTI 1998). This area is not well researched (Swartz and Boaden 1997; Smith 1999; Southern and Tilley 2000) and this paper contributes to the literature by seeking to explain successful (and unsuccessful) information management in small business.

The definition of a small business used the grounded approach proposed by (Curran, Blackburn et al. 1991) when researching small enterprises in the service sector. They argue that the heterogeneous nature of small businesses means that a single definition such as size is inappropriate, and that 'smallness' is a multi-dimensional concept linked with legal independence, type of activity, organization and economic activities. This research project was therefore based on a grounded definition of small business based on *information management intensity* where a professional practice of ten employees will be just as reliant upon IT as a retail company employing one hundred. More specifically, this tended to mean a server-based infrastructure with between 10 and 50 users.

The field of 'managing information in business' as an academic discipline is large and fragmented, and frequently analysed as a dualism between 'hard' and 'soft' schools of thought (Mingers and Willcocks 2004). The hard school uses terms such as Information Technology (IT) and Information and Communications Technology (ICT) with a heavy emphasis on the technology and tools required rather than the information generated. The soft school prefers terms such as Management Information Systems (MIS) to reflect focus on the management of systems and normally relates to larger, more formally run organisations than the small business sector.

Table 1. Comparison of 'Hard' and 'Soft' information management schools

'Hard' School	'Soft' School
Hard Science	Social Science
First Order (Factual) Questions	Second Order (Conceptual) Questions
Positivist	Interpretivist
Technology, Systems Focussed	People, Management Focussed
Practitioners	Academics
Generalizable	Specific
Technological Determinism	Social Determinism
Naturalist	Humanist

Source: (Mingers and Willcocks 2004)

This research used Boaden and Lockett's (1991) *information management* as the preferred focus to avoid undue deference to either technical or behavioural camps. Information management 'refers to an organisation using information and communication systems and information and communication technologies to enhance information processing in support of business processes and organisational decision making' (Kai-Uwe Brock 2000, p.388).

Cronholm and Gholdkuhl's (2003) useful division between 'IT systems as such' and 'IT systems in use' was used to help define 'successful' information management. 'IT systems as such' refers to *technical* success and there is an extensive body of work on formal technical evaluation based typically around return on investment analyses. 'IT systems in use' looks at IT as a tool to achieve *business* success and was the focus chosen for this project.

Much of the current literature on 'IT systems in use' uses definitions of success based upon early theories of the firm such as sales growth or profit maximisation (Thong and Yap 1996; Dans 2001; Dixon, Thompson et al. 2002; Hall and Bennett 2002; Kyobe 2004). Researcher experience and supporting literature suggests such definitions cannot always be applied to a small business community dominated by (frequently irrational) sole traders and owner managers (Bridge, O'Neill et al. 2003). This research instead used the behavioural theories of Simon and others (Baumol 1959; Marris 1964; Simon 1965; Williamson 1967) to justify *satisficing* objectives as opposed to maximising or optimising ones and uses a definition of success taken 'through the lens' of the small businesses themselves.

A secondary aim of the project was to use critical realist ideas to help explain substantive findings. Although such philosophical underpinning is advocated by many who feel it to be the 'midwife or under-labourer' of quality research (Bhaskar in Sayer, 2000) it is still seldom explicitly referenced despite research often being – perhaps unwittingly – based on critical realist ideas e.g. plurality in methodology justified as triangulation (Swartz and Boaden 1997; Hillam and Edwards 2003; Thompson and Perry 2004).

Critical realism provides a useful theoretical platform by plausibly arguing for an objective reality, interpreted subjectively. *Retroductive* research strategies were therefore adopted to identify possible generative mechanisms to explain research findings (Sayer 1992; Pawson and Tilley 1997; Danermark, Ekstrom et al. 2000; Sanghera 2004a; Byrne and Olsen 2004b). These subsequently were found to be intransitive powers such as family pressures or broken promises neither of which have surfaced in previous research in this field and would have been difficult to justify without a stratified ontology and other critical realist ideas.

Although methodologically pluralist, critical realist research lends itself especially well to qualitative data analysis (Bryman 1988) and an inductive methodology based loosely upon grounded theory was used. Theoretical sampling, constant comparison and saturation sampling were all applied during the iterative research phase. Case methods and particularly cross-case comparison were then used to achieve limited generalization (Yin 2002; Oz 2004; Byrne 2004c; Gerring 2005). Casing 'using theory to make sense of evidence and use evidence to sharpen and refine theory' (Ragin and Becker 1992, p.225) and the qualitative data description ideas from Miles and Huberman (1994) proved of especial benefit.

Finally Ragin's Qualitative Comparative Analysis (QCA) was chosen as the method to bridge the qualitative / quantitative divide by providing a synthetic approach that uses qualitative variables but formalised processing (Parker 2005). (Ragin 1987) argues his case-orientated strategies are superior to variable-orientated as they are combinatorial, account for every instance of a phenomenon, have no need to test for statistical significance and force the researcher to become familiar with cases. QCA is conducted using a five step procedure (Rihoux 2005):

1. *Qualitative Description Of The Cases.* Indispensable for both intrinsic value and to gauge the richness and complexity of individual cases. QCA requires that both unsuccessful as well as successful cases are included to identify and remove contradictory causes i.e. those that are present in both.
2. *Data Reduction To A Set Of Binary Variables.* Choose one successful or unsuccessful outcome and a number of characteristics / variables / conditions / causes. The number of variables is best between three and nine. Multiple value variables can now be managed using MVQCA or FS/QCA.
3. *Produce Quality Truth Table.* Transforming a table of dichotomised data into a truth table (list of types of configurations) is easily done using QCA software, and allows a clear picture of the data. A quality truth table is free of contradictions and is useful to highlight non-observed cases (remainder or logical) cases.
4. *Run Boolean Minimisation.* This removes redundant conditions to reduce the cases to a number of prime implicants. Logical remainders may be included to make the final terms as short as possible. Four analyses have to be performed – minimising successful configurations with and without remainders, and minimising unsuccessful configurations with and without remainders.
5. *Interpretation of Minimal Formula.* The results need to be interpreted and this will usually require the researcher to return to both the theory and the cases. The process will probably need repeating before an acceptable result is obtained and repeated iteration between data, theory and cases is a key feature of QCA.

The ultimate goal of QCA is to identify necessity and sufficiency in causes or combinations of causes. When a causal combination is *necessary* for an outcome, all instances of the outcome should exhibit the same combination of causal conditions. When a combination is *sufficient* for an outcome, all instances of the causal combination should be followed by the outcome in question. Assessing necessity and sufficiency can be achieved by grading causal conditions on the extent of their set membership and then manipulating them using Boolean algebra. When a

causal condition is necessary but not sufficient, *instances of the outcome will form a subset of the instances of the causal condition*. This means that the Boolean value of the outcome will always be less than the Boolean value of the cause and puts a 'ceiling' on an X-Y plot. When a causal condition is sufficient but not necessary, *instances of the causal condition will form a subset of the instances of the outcome* putting a 'floor' on the outcomes (Kent 2005).

In complex open systems, it is rare for causes or combinations of causes to be individually necessary or sufficient. (Ragin 2000) identifies two common forms of causation are a set of causal factors that are individually necessary and jointly sufficient for an outcome (conjuncture of necessary causes) and a set of causal factors that are individually sufficient but not necessary (equifinality). Goertz and Mahoney (2005) build on these ideas with their two-level theory with ontological, substitutable and causal relationships within and between levels.

RESEARCH ACTIVITY

The original research design was based loosely on Bell and Loane (2003) who proposed a three stage process: questionnaire, interviews, then qualitative comparative analysis. As befits an inductive strategy based on grounded theory, the resulting research was iterative and recursive with each phase being used to review and revise the findings from previous activities as appropriate. The final result was a five phase research programme shown in Table 2.

Table 2 Final Research Programme

PHASE	ONE	TWO	THREE	FOUR	FIVE
Purpose	Pilot Study	Theory Development	Theory Development	Theory Refinement	Theory Testing
Duration	Oct 2005 to Nov 2005	Dec 2005 to Apr 2006	May 2006 to Dec 2006	Jan 2007 to Jun 2007	Jul 2007 to Sep 2007
Case Definition	Organisation	Organisation	IT Instance	IT Instance	IT Instance
Fieldwork Undertaken	21 Q.naires 11 Usable Responses	6 Interviews 11 Cases (6x1 ; 5x0)	15 Q.naires 12 Interviews 24 Cases (12x1; 12x0)	11 Q.naires 11 Interviews 22 Cases (11x1; 11x0)	22 Cases (11x1; 11x0)
Methods Used	Excel Manipulation	Dichotomous MVQCA Excel Manipulation Supporting Narrative	Multichotomous MVQCA Two-Level Analysis Excel Manipulation Supporting Narrative	FS-QCA X-Y Plots Excel Manipulation Supporting Narrative	Graphical Modelling Supporting Narrative

The *first and second research phases* borrowed ideas from Swartz and Boaden (1997) and involved distributing a questionnaire requesting respondents to grade possible IT causal factors. Initially, the case was the organisation and the researcher chose a range of organisations that he believed were successful and unsuccessful users of information management. Contradictory results and a subjective and biased definition of 'successful' meant a closer engagement with the field was needed in the second stage. This took place in late 2005 and involved interviewing the respondents to clarify their answers further. Analysis of the interviews allowed a number of themes to be identified which were subsequently analysed visually in Excel then coded dichotomously for a first attempt at QCA. Tosmana QCA software (Cronqvist 2005) was chosen and provided additional insight.

Phase three saw the definition of a case change from an organisation to an information management instance once it became clear that organisations could experience both successful and unsuccessful projects. Interviews were again coded and themed and to help reduce complexity a two-stage model (Figure 1) was hypothesized using the work of Goertz and

Mahoney (2005). The model was tested in MVQCA and again provided some additional insight. Full details of research activity to this point were presented at ISBE 2006 (Parker 2006).

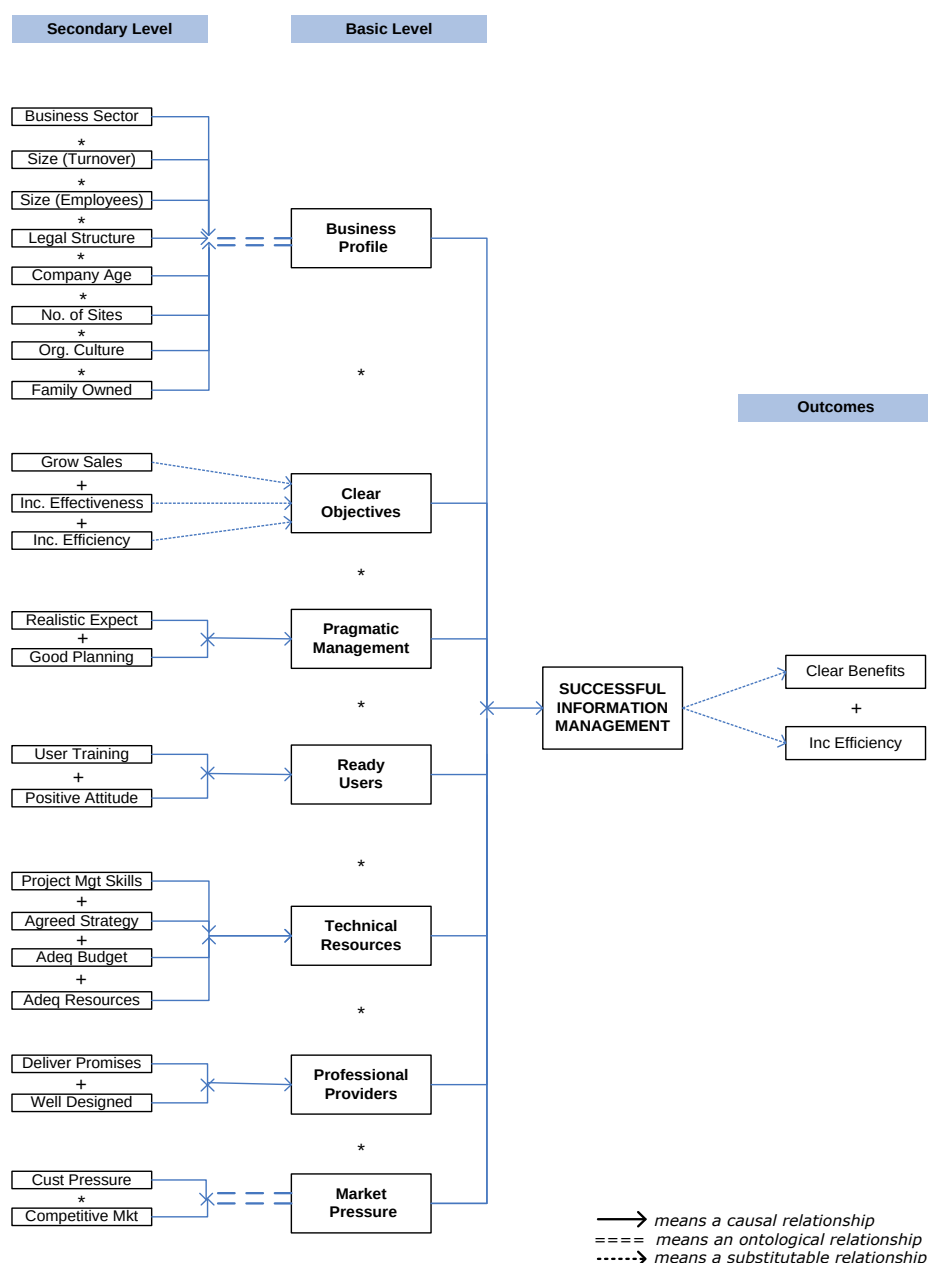


Figure 1 Successful Information Management Model (First Version)

Phase four involved another round of interviews once it became clear that the previous data was too distant to be used effectively with set-theoretic method i.e. the responses were not reliable enough to be considered set members of both successful and unsuccessful outcomes. The questions were re-designed to ensure set membership was gauged for each likely condition to enable valid subsequent fuzzy set analysis. Problems with fragmented QCA results meant a 'softer' approach was then taken to see if this would provide a less rigid framework in support of our empirical findings. The adjusted and calibrated results were again loaded into FS/QCA and the Fuzzy Set X-Y Plot tool used to provide a simple visual indication of necessity and sufficiency – a technique used successfully by both Jackson (2005) and Kent (2005).

First, causes were plotted against the outcome, then against each other for a simple cross-tab analysis. An example plot for the causal combination of Successful Outcome and Adequate Resources is shown in Figure 2 and the ceiling on the X-Y plot suggests a strong necessary relationship.

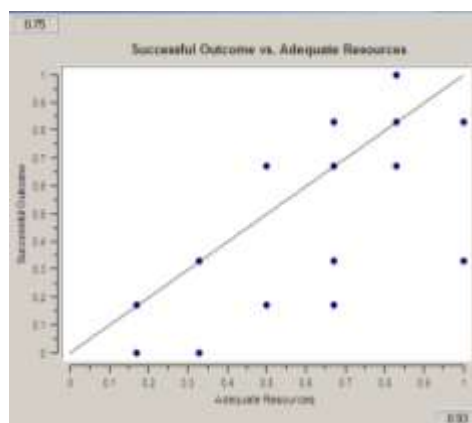


Figure 2 X-Y Plot of Successful Outcome vs. Adequate Resources

Analysis of recorded interviews and analysing the coded transcripts also suggested that the theme that arose most frequently was that of 'control'. Further analysis suggested that there appeared to be two quite distinct groups of causal factors: internal ones that the respondents as owners / managers / directors could theoretically *control* and external ones that they could merely hope to *cooperate* with. These resonated with the internal and external barriers suggested by Sarosa and Zowghi (2003) and Tsoukas's (2000) proposal that control and cooperation provide two key constituents of a critical realist metatheory of management.

Further textual analysis and coding suggested that successful outcomes were achieved when ALL internal controls were necessary, and at least ONE external influence was sufficient, and control was in place BEFORE external bodies were involved. Necessity within combinations of causal conditions implies logical ANDs to yield the intersection of set memberships; sufficiency implies logical ORs to show the union of set memberships. The relationship suggested can be stated in Boolean algebra as:

(Objectives * Management * Resources) THEN (Users + Providers + Customers) -> Success

Testing of the combined causal groups were achieved using simple MIN() and MAX () functions in Excel which replicate the fuzzy set operations for logical AND and logical OR within fuzzy sets as discussed by Ragin (2000). This results were plotted again using XY Plots as shown in Figure 3. The results are persuasive and the fit between the combination of the causal conditions suggested from the cases and the outcomes is within one fuzzy set membership scale or less which is generally regarded as valid (Goertz and Starr 2003; Jackson 2005).

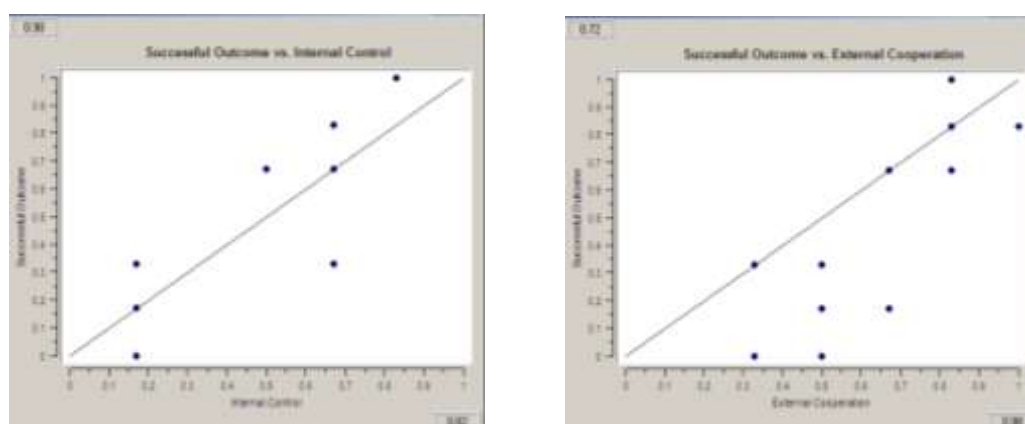


Figure 3 X-Y Plots of Successful Outcome vs. Internal Control and External Cooperation

The earlier models were revised to accurately reflect the above relationship and the final version is shown in Figure 4. This shows the secondary and basic level conditions and the relationship both within levels and between levels by developing the original Goertz and Mahoney model to

show the two causal groups (internal control and external cooperation) and the six causal conditions within them.

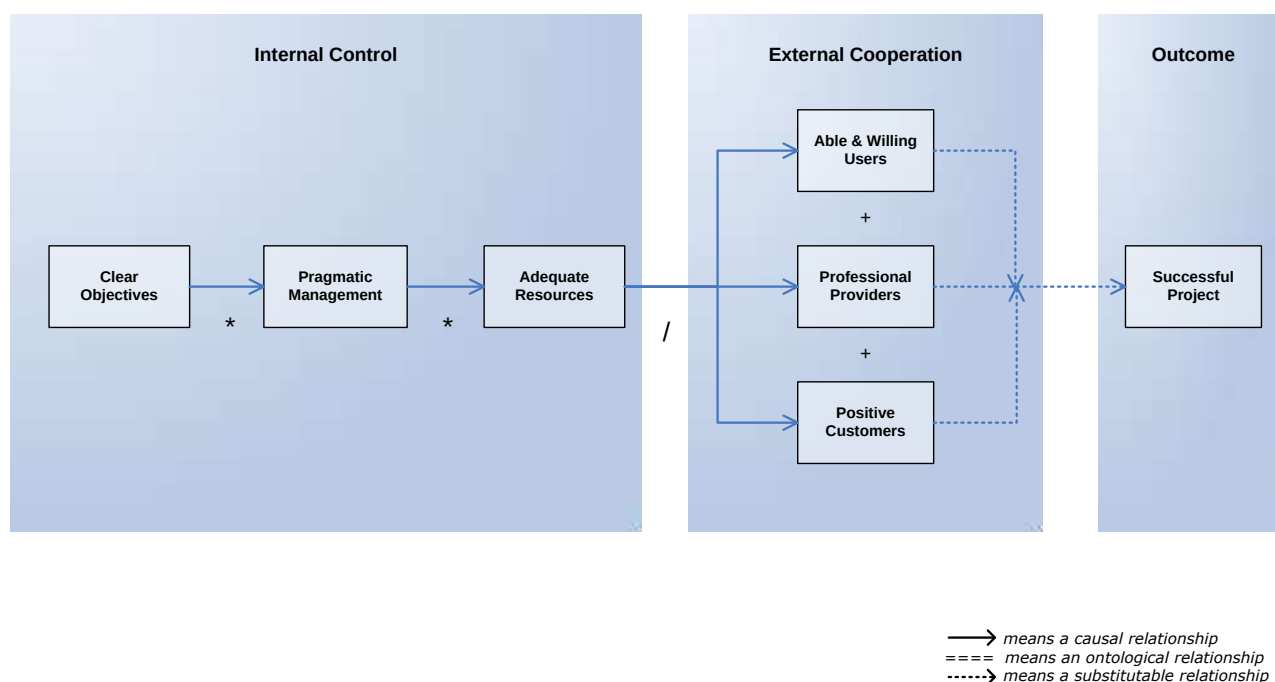
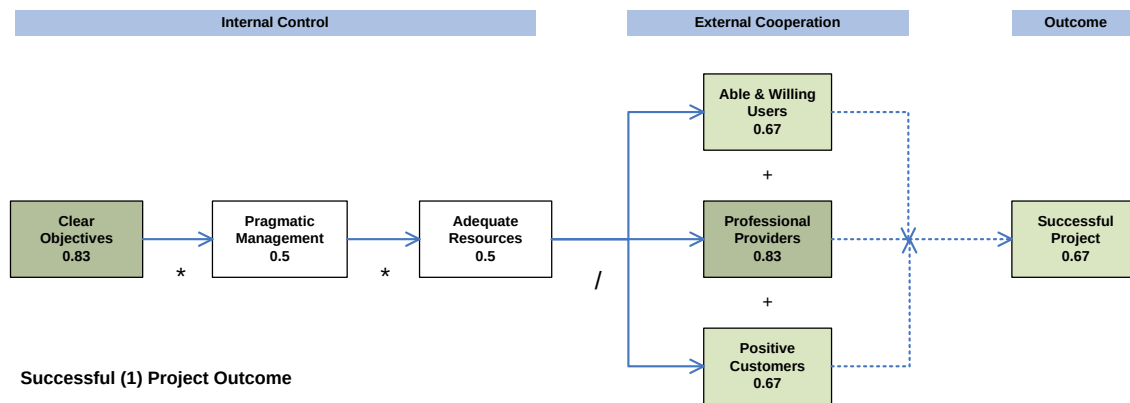


Figure 4 Successful Information Management Model (Final Version)

Within the internal control condition group causal conditions are shown horizontally to help show that they are nearly always necessary conditions joined by logical ANDs. Aligning them horizontally is useful in practice to show these as *hurdles* which must *all* be overcome to ensure a successful outcome. Within the external cooperation group conditions are shown vertically to help show they are nearly always individually necessary but jointly sufficient conditions joined by logical ORs. Aligning them vertically helps explain to practitioners that these are channels *any* one of which can be taken to ensure a successful outcome.

Causal groups are aligned horizontally to show that internal control logically precedes external cooperation. These two groups are joined by a *causal relationship line* and logical AND to show that they are both necessary condition groups i.e. supersets of the outcome. The dotted line from external cooperation again uses the (Goertz and Mahoney) standard to show that the routes to the successful outcome are substitutable.

The *fifth* and final phase of the research involved testing the 'soft' findings substantively against the cases themselves (Goertz 2002). The result was unique case descriptions which used combinations of logical, colour-coded models and textual quotes to explain both successful and unsuccessful information management projects. Case descriptions were created for all twelve cases and an example (Surveyor) is shown as Figure 5 (over).

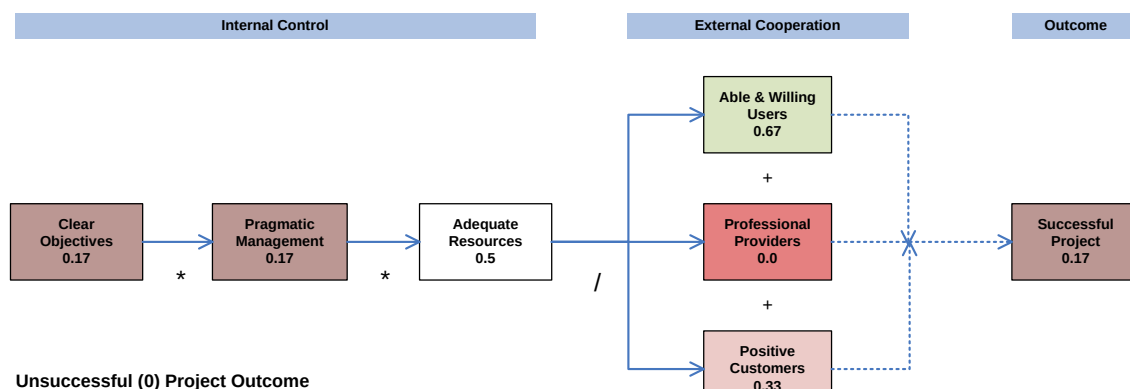


Background. Surveyors successful (1) project was a systems and infrastructure upgrade conducted in 2003. The (0) project was conducted in 2001 and involved the failed introduction of a document management system. The respondent is a senior partner.

Clear Objectives. Highly rated on the 1 project. "We was a clear pressing need for a working system ... we had to have it. There was an overwhelming need to sort this out." Not so with the 0 project. "For the < document management software > project there was not such a pressing need for it. It was something that had it have worked would have been useful but not critical to us. Evidenced by when it didn't work we didn't replace it." "(Lack of objectives) was extremely significant in our failure."

Pragmatic Management. Unrealistic expectations featured highly in the 0 project ... "we thought we'd pay the money, get the box and everything would be rosy!" As a busy professional practice with no dedicated IT manager, it was similar for the 1 project ... "The successful project – we didn't have much management in it either ... we just let your guys get on with it. We bought it (the management) in."

Adequate Resources. Time (is money) the big issue in both cases. Capital investment in both not significant especially 0 project. "Not ultimately money (they refunded it)." With both projects there was a distinct 'arm's length' involvement from busy professionals.



Able & Willing Users. People are important in a professional practice and unusually were more committed to the 0 project than the successful one. Most people could see the benefit of the successful project but "some people were not 100% committed to it and felt it could be threatening." The document management project was more exciting and saw people very enthusiastic and therefore very disappointed when it failed.

Professional Providers. For "the successful project our reliance was 100%." "Same with the second one. Difference in the second one was that we were going through a reseller to get to the technical people. "We were utterly reliant on both of them, but the technology just didn't do what it was supposed to." Promises were not delivered leading to a rare 1 (0.0) score.

Market Response. The need for reliable, robust communications with customers drove the 1 project. "Definitely for the successful project – we had to do it." The failure of the document management project had negative response "We anticipated using the unsuccessful project for work with a particular client. It caused us a big problem at the time."

Successful Project. Comments reflect the reliance on busy professionals to delegate this work effectively ... "We got the right / competent people on one job; we got the wrong / incompetent people on the other job." Reliance on providers is very high ... "From our point of our view: we are not IT people and we will go to the market to get people to do it for us and we will pay a fee to get the system working as it should."

Figure 5 – Successful & Unsuccessful Case Description (Surveyor)

RESEARCH CONTRIBUTION

The primary contribution of the research is a simple – but not simplistic – model showing the combination of causes which leads to success information management in small business.

The need for clear objectives, pragmatic management and adequate resources to ALL be in place as a causal group has not been identified as a combination of necessary causes for IT project success in previous work. This finding has been obscured in the averaging process conducted by many previous papers (Thong and Yap 1996; Dans 2001) which use frequentist statistics to suggest that success may still be possible even if some of these conditions are missing, or all are in place but only partially effective i.e. problems of linearity and additivity.

The ability for the major components of the external co-operation causal group to compensate for each other via logical ORs (equifinality) was also novel. The placement of able and willing users in the external group differs from previous models but reflects the managerial focus of the respondents and the genuine feeling that users was something they had little control over. The dominant condition in the external group was professional suppliers which was the nearest to becoming sufficient in its own right but demoted from this elevated status by subconscious researcher bias in case selection.

Competitive pressure was only briefly mentioned by two cases (Finance Co and Show Organiser A) but strong external support and expertise was mentioned by all. Internally, lack of planning, objectives and resources again strongly resonated with the literature. Blackburn and McLure's (1998) taxonomy (Enthusiast, Pragmatist and Artisan) helped provide the pragmatic management element but their other findings were not widely supported. This may be due to this project's focus on IT managers rather than owner managers but may also be due to structural shifts in the past nine years i.e. information technology in small organisations is now inevitable rather than optional.

Time is important substantively as well as theoretically. The need for internal control to be established *before* external cooperation is sought using the 'THEN' operand again sounds obvious but was a surprisingly common reason for failure in unsuccessful cases where external pressure from unprofessional suppliers (Show B, Engineering A) or customers (Show A) led to external investment before internal control has been established. The message to suppliers is 'don't promise what you can't deliver'; the message to small organisations is avoid complex or unproven information management products wherever possible to minimise the risk of project failure.

Our time-based, two stage model both supports and adds another dimension to the four major types of IT failure proposed by Lyytinen and Hirschheim (1987) and shown in Table 2. Correspondence failure and process failure both confirm the need for *internal control* whilst interaction failure and expectation failure confirm the need for subsequent *external cooperation*.

Table 2 Enhanced IT failure model

Internal Control	External Cooperation
Correspondence failure: Where IT/IS does not match planned objectives.	Interaction Failure: Where the IT/IS is not used due to negative user attitudes
Process failure: Where IT/IS implementation is not completed within planned time or cost.	Expectation Failure: Where the IT/IS does not match user expectations

(Developed from Lyytinen and Hirschheim 1987)

The level of abstraction reached in the model is effectively middle-range i.e. an empirically grounded activity with a limited claim to generalisation: 'Theories that lie between the minor but necessary working hypotheses that evolve in abundance during day-to-day research and the all-inclusive systematic efforts to develop a unified theory that will explain all the observed uniformities of social behaviour, social organization and social change' (Merton 1968, p.39).

The research also identified a number of new causal mechanisms from analysis of the models, QCA output and interview themes (Table 3). That this list is far from exhaustive and that the causes impact individually and in causal groups and in different degrees at different times gives a hint of the complexity involved. What is interesting is that intransitive behavioural issues such as lack of trust or loss of control were felt to be really important but have not featured significantly in previous research in this area.

Table 3 Possible Causal Mechanisms in Successful Information Management

Possible cause	Cases observed
Unrealistic expectations	Insurance Broker, Hotel, Surveyor, Finance Co, Show B, Manufacturer
Organizational learning	Insurance Broker, Restaurant, Show B
Top management input	Hotel, Show B, Manufacturer, Charity
Customer focus	Insurance Broker, Show B
Broken promises	Retail, Hotel, Surveyor, Finance co, Show B, Restaurant, Charity
Project mgt experience	Engineering B, Engineering A
Loss of control	Retail, Engineering B
Improved planning	Insurance broker, Restaurant, Show A
Technical complexity	Hotel, Charity, Finance Co, Show A
Willing users	Insurance Broker, Hotel, Finance Co, Show A, Show B, Manufacturing
Able users	Engineering B, Recruitment, Surveyors, Show B, Manufacturing
Costs not benefit focus	Insurance Broker, Hotel, Manufacturing
Lack of objectives	Surveyor, Charity, Manufacturing, Show A
Lack of time	Surveyor, Show A
Resistance to change	Show B, Surveyor
Technology failure	Retail, Hotel, Surveyor
Customer pressure	Insurance Broker, Surveyor, Show B, Show A
Supplier pressure	Retail, Charity, Engineering A, Finance Co
Keeping people informed	Retail, Engineering A, Show B, Show A
Supplier Trust	Retail, Charity, Show B, Show A, Engineering A
Constraint to growth	Engineering A, Show B, Finance Co
Informed decisions	Engineering A, Show B

A further finding was that the deterministic view that all information management is inherently good is clearly challenged in complex, open systems. *It is not that the technology won't work it's just that its ability to do so might be negated or enhanced by complex, contingent causality.* This research has shown this to be the case both individually and, critically, in causal combinations. Although only hinting at the complexity involved the findings provide new and valuable insights into this area. Mutch (1999, p.331) concurs and believes 'an approach based on critical realism has the potential to not only give us a better account of information at work, but also forging a better integration between the worlds of organization and information theory.'

The research also confirmed that decision making in small business is not always rational. Maximisation as a business objective was rarely encountered and satisficing more the norm. This has important implications for small business researchers who still tend to use traditional measures of success especially in quantitative based projects. The diversity so prevalent in the small business sector makes this assumption far from conclusive.

All of the organisations (bar Engineering 1 and Engineering 2) admitted to *not* having clear objectives which not only helped explain unsuccessful projects but also undermined claims from the rational decision making camp. Reviewing the quotes from respondents and the findings of QCA clearly supports the ideas that power, prestige and other managerial satisficing issues were far more important than traditional maximising ones. Again, sacrificing nomothetic laws need not resort in ideographic chaos as the identification of empirical patterns confirms the tendency for common ambitions to emerge from deeper domains.

The research also showed how critical realist ideas can help explain structural changes over time. Incorporating time is now a subject of considerable interest in the QCA research community with a number of papers addressing the issue (Caren and Panofsky 2005; Hino 2007; Olsen 2007) although Ragin rightly points out that temporal sequencing was addressed in his original book (Ragin and Strand 2006).

Time was an issue *within* every case due to the temporal sequencing of internal control THEN external cooperation. In a few organisations there were also clearly linked temporal issues *between* their successful and unsuccessful cases. A good example is Insurance Broker who had the same driving mechanisms in both successful and unsuccessful cases i.e. a need to cut costs and high availability of good IT. In the first case however the power of both mechanisms was negated by reactive management and family autocracy. In the second case five years later, the *tendency* for cost and IT potential causal powers were in still place, but proactive management and family meritocracy added to these to provide an extremely successful outcome in actual and empirical domains.

An interesting point raised here by the partner interviewed was that the original, failed project was such a disaster that it actually provoked the change in management style and authority needed to provide the structural conditions necessary for the successful outcome.

"When the old system was coming to the end, Dad just walked in and said 'we're getting this one' because it was free! We didn't make the same mistake the second time round." Insurance Brokers.

Critical realist ideas come to our aid again here, and this structural conditioning resonates with the work of Archer (1995) by providing supporting evidence for subsequent *structural elaboration* or morphogenesis at a microsocial level. Borrowing the ideas from Archer (p.193) allows us to show this as Figure 6.

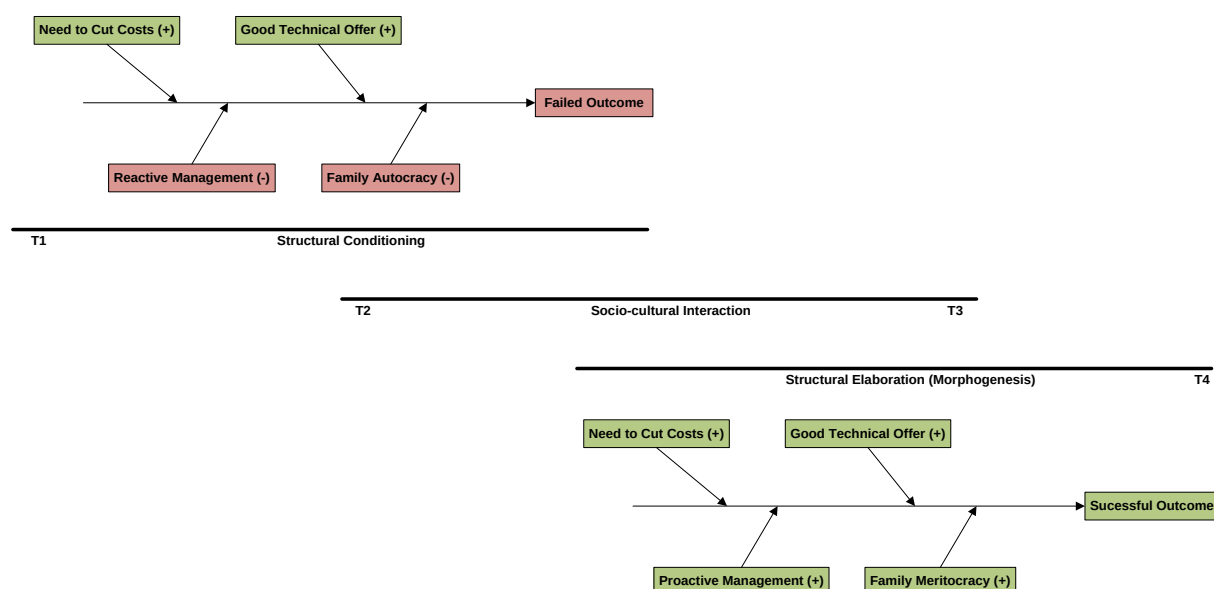


Figure 6 Evidence of Morphogenesis in Insurance Broker
(Based on Archer 1995, p.193)

There was also evidence in another organisation (Show B) where the cultural integration *reproduced* structures over time (morphostatis) and it was the actions of agents which contributed to the change in outcome (Figure 7).

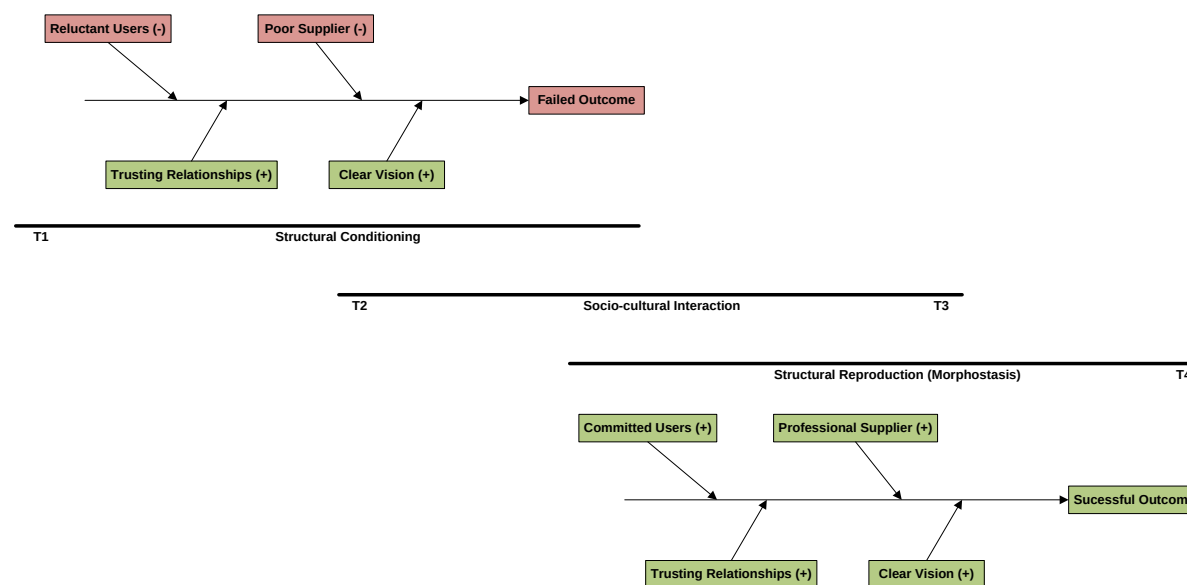


Figure 7 Evidence of Morphostatis in Show B
(Based on Archer 1995, p. 193)

The importance of time in critical realist explanations is stressed too by Mutch (1999) who also uses Archer's analytical dualism i.e. the interplay between agency and structure to explain how people managing IT inherit the situations in which they find themselves but have the choice as to how they react to these and whether they will change or reinforce them. He too produces a model of the process of information creation based on Archer's morphogenesis ideas and confirms that Archer argues that the approach is just as fitting for smaller-scale situations as 'the great sweeps of history' (p. 331).

The research also usefully showed how the explicit use of (critical) realist research strategies can prove a useful and ontologically sound basis on which to go beyond simple empirical QCA findings. The brief use of retrodution to try to explain activities in the deeper domains has enabled regularities to be identified and limited generalisation permitted on the basis of what works for whom in which circumstances (Pawson and Tilley 1997). This has been achieved using combinations of causes without recourse to statistical significance or other quantitative norms yet these ideas allow patterns to be explained without the relativism and reductionism of purely nominalist approaches. As such, critical realism as a possible useful 'third way' helped greatly through its ability to rationalise an objective ontology with subjective epistemology (Morton 2003).

It was also clear that structural issues were important and embedded, intransitive issues such as power, control, trust and 'promises broken' appeared regularly (Insurance Broker, Show A, Show B). The several respondents could regard an information management project as being unsuccessful through something as intransitive as 'abuse of trust' has major implications for the IT evaluation field. The research was therefore successful in showing how the exercised technical powers and liabilities of information management objects could be reinforced or negated by other objects with their own powers and liabilities.

Finally, the research showed that realist ontological ideas can help rationalise dualist extremes in both the management of information and the definition of success. For example, there was evidence that when information management instances were based on clear objectives (a necessary internal control causal condition) outcomes tended to be successful which clearly resonates with the 'hard' school of information systems being used to 'aid decision making in pursuit of goals' (Checkland and Holwell 1998, p.48). There was however also evidence to

support Callaghan's argument to investigate 'socio-political forces rather than any inherent character of technology' (Callaghan 2002, p.290) and phenomenological issues such as family relations lend weight to the 'soft' interpretive school of information management theory.

Whilst a purely constructivist interpretation (Walsham 1995) may therefore appear more attractive, the clear evidence of *patterns of causal conditions* requires explanation. If information systems are simply nominalist 'forms or social systems realizing human intentions' (Iivari, Hirschheim et al. 1998) then regularities should not occur. They do however, in both extensive, quantitative research finding commonality around means (Thong 1999) and in intensive, qualitative research finding simple taxonomic groups (Smith 1999).

Where this research adds to the literature is its use of critical realist ideas to try to rationalise these apparently conflicting findings using a highly plausible ontological and epistemological perspective. Both 'hard' and 'soft' views are valid when ambition and trust are considered as transfactual powers in the real domain. That these emerge as business goals and broken promises in the actual domain and are witnessed as increased efficiency and sacked suppliers in the empirical domain testifies not to paradigm incommensurability but to effective abstraction and retrodution as part an intensive realist research strategy.

CONCLUSIONS AND IMPLICATIONS FOR FURTHER RESEARCH

The research provided useful example of what Sayer (2000) would call abstract research i.e. venturing beneath events to try to understand the mechanisms and structures beneath.

The next step will be to develop this retrodution as the models used to substantively test the cases are very much 'models of' the cases rather than 'models for' the subsequent deep retroductive analysis required of the critical realist research strategies outlined by Sanghera, Sayer and others. Or as Stake (1995) would put it, our cases are still intrinsic rather than instrumental.

Blundel (2006) regrets the desperate shortage of in-depth small business research using critical realist methods so the next research project is to conduct one case study in significant depth using a retroductive research strategy to develop critical realist ideas further.

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