

A Complementation of Quantitative and Qualitative Analytics for Arriving at Conclusive Social Research Findings

Prof. Malek Elahi
Graduate School
University of the East
Manila, Philippines
Email: khan_101010@yahoo.com

Dr. Roberto F. Villarroel
Graduate School
University of the East
Manila, Philippines
Email: bob_villarroel@yahoo.com

Abstract—Aims: This paper is presented to the international community for the purpose of validating the authors' contentions that there are situations where there is need to go beyond statistical power analysis for a necessary-and-sufficient condition in achieving conclusive research findings in Management Science.

Methods (for revealing the conclusion):

1. **Reflective.** A qualitative research process relying on intuition and judgment in order to portray or evaluate phenomena being studied as recorded in text
2. **Structural.** A qualitative-data process of examination for identifying patterns in texts

Conclusion: It is not always the case that quantitative analysis can stand alone in research analytic.

Significance: There are allegations to the effect that there are two approaches to research methodology; one is quantitative and the other qualitative, as if one can exist without the other for a holistic research approach. This paper forwards the claim that every research paper needs the complementation of quantitative and qualitative analytics in order for the findings to be conclusive.

Developed Model: Procedure for the Complementation of Quantitative and Qualitative Analytics for Arriving at Conclusive Research Findings

Keywords: *statistical power analysis, interpretational analysis, structural analysis, reflective analysis, social science research, social reality, social response*

I. INTRODUCTION

There are seven paths to knowledge, be it in Management or in any field of study, as follows:

- 1) Cognitive, "through the use of the five senses"
- 2) Logic, "reasoning"
- 3) Extra sensory-perception, "awareness outside the use of the five senses"
- 4) Instinct, "automatic innate response to stimuli"
- 5) Faith, "the gift of being able to converse with the Creator"
- 6) Intuitive, "programmed response to stimuli embedded in the subconscious"

7) Musical, "response to stimuli yielding a melodic composition"

The last five items results in value judgments in reaching decisions [21]. Or what dictators would name as "judgment-calls" when asked how he/she reached a decision. Value judgements are decisions reached without the use of a third point of reference which can be validated. When the decisions of many are involved concerning an issue for which there is no third point of reference, the decision is reached not by referring to facts but by EITHER dividing the house (i.e., referring to a voting procedure) or by referring to mutually agreed standards. Say, for a musical composition to earn popularity, reference may be made to the technical requirements of rhythm, but the final acceptance of the new melody is made when it earns enough sales to garner a platinum award --about a million pieces being sold [1].

II. Content Proper

A. Modes of Analysis:

Among the following modes of analysis for triangulating research findings; namely, statistical, interpretational, structural, and reflective, the latter three may use all the seven paths to knowledge enumerated earlier in this paper under INTRODUCTION; on the other hand, statistical power analysis can use only the enumerated first two paths as can be deduced from the following definitions of the four modes of analysis:

1. Statistical power -a procedure for determining the likelihood that a particular test of statistical significance will be sufficient to reject a false null hypothesis based on the premise that a fact in the environment remains a fact independent of the observer. For instance, the colour red remains red regardless of what colour the blind person sees. The point of interest in social science research (to which Management Research belongs since it studies social relationships) is not so much in individual perception but in whether at least two entities can agree to a common response (social response) regardless of the difference in individual stimuli perceived. For as long as a colour blind person (who sees gray instead of red) can agree with a non-colour blind person (who sees red) to the activity of stopping, means a social response (a product of agreement between at least two individuals) to a stimulus is different from individual responses to stimulus (one seeing gray when the other sees red; or one appreciates a melody which the other person does

not appreciate; or what is delicious to someone may not necessarily be delicious to another). Being able to agree despite difference in individual sense cognitions (stimulus reception) makes language (transmission of decoded signals) possible. With language, specialization in activities to achieve increased productivity encourages the further use of resources for achieving growth to attain increased social sharing. Statistical Power Analysis in social science research deals with research problems that seek patterns of common response or what one may call as a social response to stimuli [17]. But statistical power analysis has its limitations as demonstrated in the following example which forces the social researcher to seek non-statistical analysis as in the following [6]:

For example:

Given the following joint observation data:

TABLE I. Joint Observation Matrix for the Dependent Variable “Y” and the Two Independent Variables “X₁” & “X₂” Per Respondent and Their Processing

Respondents	Y	X ₁	X ₁ ²	X ₂	X ₂ ²	x ₁ x ₂
A	1	0	0	1	1	0
B	1	0	0	1	1	0
C	1	0	0	1	1	0
D	1	1	1	1	1	1
		Σx ₁ =1	ΣX ₁ ² =1	Σx ₂ =4	ΣX ₂ ² =4	Σ x ₁ x ₂ =1

$$r_{x_1 x_2} = \frac{n \sum x_1 x_2 - \sum x_1 \sum x_2}{\sqrt{[n \sum x_1^2 - (\sum x_1)^2]} \sqrt{[n \sum x_2^2 - (\sum x_2)^2]}}$$

$$= \frac{4(1) - 1}{\sqrt{4(1)-(1)}} \frac{4 - 1}{\sqrt{4(4)-(16)}} = \frac{3}{0} = \infty$$

The result is beyond the acceptable range of -0.7 to + 0.7 which means there is multicollinearity as shown immediately below in the sub-section on Regression Analysis: C1 versus C2, C3 where multiple regression cannot be done, but nonetheless the regression yields a simple linear regression where C2 or X₁ has a value of 0.00, interpreted as yielding a status for the variable C2 of being a maintenance factor in respect of Y. The removability of C3 as a variable due to its constancy gives no indication, from the viewpoint of multiple regression, that it causes Y to occur. This forces the researcher to look for other analytical approaches which may or may not be based in using all the rest of the seven approaches to knowledge which were listed in the preceding item on INTRODUCTION.

For instance, the researcher may claim that a simple count of majority in the association between Y and C3 creates a pattern of close association which may not necessarily show a causal relationship but nonetheless makes C3 a suspect in causing Y to happen. Further, the researcher

must have to know from the respondents whether his/her interpretation as a researcher of the social reality surrounding the participants, which are based on concepts and theoretical frameworks which are in the researcher’s mind, jibes with the participant’s perceptions and understanding of social reality [15].

Regression Analysis: C1 versus C2, C3

- C3 is (essentially) constant
- C3 has been removed from the equation.

The regression equation is C1 = 1.00 + 0.000000 C2. [14]

2. Interpretational -the process of examining qualitative data to identify constructs, themes, and patterns that can be used to describe and explain the phenomenon being studied [11]. For instance, an alien may be interested in the orderly manner every earthling stops as a response to changes in the colour of the traffic light. And because of its advanced observation instruments, it may observe too that not every earthling sees red but despite some earthlings seeing gray the latter stops to cross the street [10].

To the alien, it is not important what colour different earthlings perceive; for the alien, what is important is the orderly pattern by which every earthling stops as a response to the colour of the traffic light regardless of what colour a particular earthling sees [7]. Some earthling may have learned early in life that gray means to stop crossing while for other earthlings red means also to stop crossing; what is important to the alien researcher is the pattern of behaviour resulting from the changes in the traffic lights colour regardless of what colour every earthling sees for as long as there is harmony or commonality in the pattern of responses [18].

3. Structural -the process of examining qualitative data to identify patterns that are inherent features of discourse, text, events, or other phenomena. The same illustrative example applies in this definition as in interpretational analysis [12].

4. Reflective -in qualitative research, a process in which the researcher relies primarily on intuition and judgment in order to portray or evaluate phenomena being studied [8]. The same illustrative example applies in this definition as in interpretational analysis. The stimulus may be different, as difference in colour, but to the social researcher what is important is the recurring pattern of response of stopping to cross when either red or gray is perceived. The social implication on harmony due to their mutual agreement for similarity (righteousness) in their pattern of response as “stopping to cross a street” triggered by the stimulus, be it red or gray, is more important than the truthfulness of whether a red or a gray was seen [18].

Another example of the inadequacy of having Statistical power analysis stand alone, which is in the realm of the Quantitative Approach, is the following simulated example:

1. Statistical power analysis:

TABLE II. A Set of Joint Observations on Two Dependent Variables and One Independent Variable:

Respondent Corporation	Dependent variable 1 [DV 1] Profitability [ordinal assignment of 0 for non-profitability and 1 for profitability]	Dependent variable 2 [DV 2] Sales Turnover [ordinal assignment of 0 for below average sales turnover and 1 for above average sales turnover]	Independent variable Composition of Corporate Board (family [nominal assignment of 0] or non-family professional managers [nominal assignment of 1])
A	1	0	0
B	1	0	0
C	0	1	1
D	0	1	1

A factorial design of the preceding table's (Table 2) joint observation matrix reveals the following classification of the respondent corporations:

TABLE III. Factorial Design of the Preceding Table's (Table 2) Joint Observation Matrix

	Corporations with exclusive family board members 0	Corporations with exclusive non-family professional board members 1
Corporations with exclusive non-family professional board members 0	A's DV 1: 1 A's DV 2: 0 B's DV 1: 1 B's DV 2: 0	
Corporations with exclusive family board members 1		C's DV 1: 0 C's DV 2: 1 D's DV 1: 0 D's DV 2: 1

The factorial design cannot yield an answer since not all quadrants have data.

Subjecting Table 2, containing the joint observations, to regression is not possible since the latter procedure accommodates only one dependent variable.

2. Interpretational, Structural, and Reflective Analytics: Clearly, the preceding reveals the inadequacy of Quantitative Analytics despite the **following** glaring conclusion that can be obtained by a simple ocular inspection of the table's (Table 2) joint observations by using the pattern-seeking approaches of Interpretational, Structural, and Reflective Analytics:

-That Corporations with exclusive non-family professional board members have less than average profitability while Corporations with exclusive family board members have more than average profitability.

-That Corporations with exclusive non-family professional board members have higher than average sales turnover while Corporations with exclusive family board members are have lower than average sales turnover.

III. ANALYSIS-and- SYNTHESIS

All the preceding four analytical approaches are coming from the perspective of the researcher on how the research participants see social reality based on an "etic" perspective

which uses the researcher's conceptual and theoretical understanding of the research participant's social reality. In fairness to the research participants, the latter's perceptions and understanding, called as "emic", of their social reality are also obtained [20].

The social researcher (for example, a management researcher) is interested in discovering whether there is commonality of response between at least two entities (whether institutional or personal) because it means there is order in mutual behaviour between the entities; and where there is order, the organized or syndicated specialization of activities for exploiting resources for accelerated growth is possible [4]. The social researcher, say aliens from the planet Mars, know that earthlings share the same scarce resource as they use which makes the aliens very interested in the earthlings' ability to reach an agreement towards commonality of response to stimulus they experience differently (as in colour blindness) if only to achieve order, a prerequisite for organized use of scarce resources with which the aliens are in competition [2].

The latter three analytical processes are called analytical inductions whereby themes and patterns are inferred through a process of examining data which may use all the seven paths to knowledge. On the other hand, statistical power analysis is grounded on the assumption that features of the social environment constitute an objective reality that is relatively constant across time and settings; and the difference in perceptions (say, due to colour blindness) is not as important as their ability to reach an agreement to a common and harmonious response to the different colours they personally see. Say, for traffic purposes the red light, which signifies the behaviour of stopping as righteous, is red across time to all persons [16]. But such an assumption may not hold for those persons who are colour blind in another setting who sees the colour red as gray, and for whom the colour gray means exuding the behaviour of stopping as righteous. In both cases involving persons who see red and stops; and those who see gray and stops also, must have arrived at a common social response which they both consider as righteous when they exhibit the common behaviour of stopping [5]. Nonetheless, one of them is not truthful when both parties say they see red. Only one party is truthful when he/she says red is the colour seen because the other presumably sees gray from the same stimulus because of being colour blind [19].

IV. CONCLUSION

In being righteous in this case, traffic order is maintained without need to refer to the truth which is subjective. Hence in social science research where the purpose is to discover the necessary and sufficient conditions for what is right in terms of commonly agreed responses to different personal perceptions on an alleged objective stimulus and not so much as to uncover only what is the necessary individual truths, qualitative research which uses analytical induction whereby general themes and patterns of behaviour are inferred from an examination of particular data (reflective analysis even uses intuition and judgment which are not used in the quantitative approach to analyzing data) becomes as

necessary as quantitative research where conclusions are drawn only from premises about the objectivity of truth [3]. And since what is true to one may not be true to another, what needs to be discovered is whether the two can reach an agreement on a common social response (or what is righteous) regardless of their differences in individual sense-responses (ability to know the truth in terms of smell, sight, hearing, taste or sensation-of-texture) [9]. Can two individuals arrive at an agreement on a common social behaviour even when they see different truths from a common stimulus (say, the normal person sees red, while the colour-blind sees gray from the same stimulus)? If a common harmonious behaviour is exuded from two different individuals who see a common stimulus differently (different truths as in colour blindness), then pragmatism, in terms of knowing how social order is achieved, is the controlling notion for continuing the social research activity and not the search for objective truth (since the truth is in the eyes of the beholder as in colour blindness) [13]. The question now is, “Are all instances of observation dependent on subjective truth? Can the phenomenon of colour blindness be extended to “blindness” to other stimuli in the environment such as those that trigger smell, sight, taste, or sensation-of-texture? If so, can persons arrive at a social agreement to behave harmoniously or similarly to a stimulus which they individually sense differently (as the saying goes, “one man’s meat is another man’s poison”)?

Employing the other analytical approaches as demonstrated in 1. is the only way to find out if persons can arrive at a social agreement to behave harmoniously or similarly as a social response to what they sense-response (see, smell, hear, touch, or taste) differently as individuals.

V. RECOMMENDATION

The only way to find out if persons can arrive at a social agreement to behave harmoniously or similarly as a social response to what they sense-response (see, smell, hear, touch, taste) differently is for social science (under which Management Research belongs) researchers to employ the other analytical approaches as demonstrated in 1. on the elaboration of statistical power analysis.

VI. SIGNIFICANCE

There are allegations to the effect that there are two approaches to research methodology; one is quantitative and the other qualitative, as if one can exist without the other for a holistic research approach. This paper forwards the claim that every research paper needs the complementation of quantitative and qualitative analytics in order for the findings to be conclusive as substantiated in an illustrative example in the preceding 1. on the elaboration of statistical power analysis.

VII. DEVELOPED MODEL

Procedure for the Complementation of Quantitative and Qualitative Analytics for Arriving at Conclusive Social Research Findings

(I. Introductory section)

- The researcher explains his/her experience, orientation, and expectations relevant to the problem being investigated and indicates how these factors might affect the results;
- Given the contextual background, the research must be carried out currently in a real-life setting;
- Determine whether any research traditions shall be used as a basis for the study, and if so, they should be used appropriately in the definition of the research problem and in the collection, analysis, and interpretation of the data;

(II. Research procedures)

- Specify a preliminary plan for the study but be ready to modify the plan as needed in response to analysis of data early in the study;
- Use a random sampling strategy to select participants to the research question and the definition of the phenomenon of interest but be ready to shift to purposeful sampling when respondents do not appear for interview despite repeated attempts to reach them; this shift in sampling procedure will change the generalizing procedure from deduction (starts with a theoretical or conceptual guideline in collecting particular data to prove the validity of the theory) to induction (from particular cases towards the derivation of a general pattern or theory of social behaviour).
- Use the data-collection method suitable to the intended purpose;
- Allow sufficient time-frame for data collection so that an in-depth study of the research question can be made;
- Use strategies that will ensure consistency across observers or other data collectors that would demonstrate agreement among observers in their observations; particularly the fit between the data and what occurs in the setting under study.
- Use quantitative data, if it can be obtained, whenever appropriate to understanding the research problem or question; specially when the quantitative comments as to expected research findings are identified by catch phrases or words, such as “more than”, “significant”, “extremely”, “not very much”, etc.
- Examine whether quantitative measures can be used to document the preceding catch phrases or words in terms of data that indicate means, standard deviations, correlations, and predictability coming from regression;
- See to it that various data-collection methods or sources of data are used and compared to confirm or clarify the key findings of the study;

(III. Discussion of results)

- See to it that the written report makes clear each research procedure used and the order in which they occurred so that it would be possible for other researchers to replicate the study;
- See to it that the written report includes sufficient quotations or summary comments from the research participants/respondents in order to clarify (emic) their perspective

- Check the findings with members before finalizing the written report;
- Check whether you, as the researcher, have summarized your personal reaction to the findings or have compared (etic) your perspective on the phenomenon studied to those of research participants or respondents;

(IV. Research results)

- Identify how you interpreted the findings and whether you considered alternative interpretations;
- See to it that your conclusions are supported by the data and its analysis;
- Determine how the research findings can be applied to other settings or types of research participants/respondents; and give justification for said extension;
- Draw reasonable implications for practice and future research and see whether such implications are justified by the research findings.

REFERENCE

- [1] Altheide, D. L., & Johnson, J. M. (1998). Criteria for assessing interpretive validity in qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp.485-499). Thousand Oaks, CA; Sage.
- [2] Atkinson, P and Delamont, S. (2005) *Analytic perspectives*. C.A: Sage
- [3] Atkinson,R.(2005). *Handbook of interview research*. CA: Sage.
- [4] Christians, C.G. (2005). *Ethics and politics in research*. C.A: Sage
- [5] Charmaz, K. (2005). *Grounded Theory*. C.A: Sage.
- [6] Cohen, J (1988) *Statistical power analysis for the behavioural sciences* (2nd ed.) Mahwah, NJ: Erlbaum.
- [7] de Laine, M. (2005). *Fieldwork, participation and practice*. CA: Sage.
- [8] Eisenhart, M. (2005), Changing conceptions of culture and ethnographic methodology. In V. Richardson (Ed.), *Handbook of research on teaching* (4th ed., pp. 209-225) Washington, DC: American Educational Research Association.
- [9] Errante, A. (2005). But sometimes you are not part of the story. *Educational Researcher*, 29(2), 16-27.
- [10] Eysenck, M. W. and Keane, M. T. (2005). *Cognition: a student's handbook*. N.Y: Psychology Press.
- [11] Garatt, D. (2005). *Researching against the rules*. Cresskill: Hampton.
- [12] Guba, E. G., & Lincoln (2005). Paradigmatic controversies, contradictions, and emerging confluences. In N. K. Denzin & Y. S. Lincoln (Eds.), *The Sage Handbook of qualitative research* 3rd ed., pp. 191 – 215). Thousand Oaks, CA: Sage.
- [13] Hays, P.A. (2005). *Foundations for research* NJ: Erlbaum
- [14] Hoaglin, D. C. Mosteller, F. & Tukey, J. (2000). *Understanding robust and exploratory data analysis*. New York: Wiley.
- [15] Murphy, K. R., & Myors, B (2004). *Statistical power analysis: A simple and general model for traditional and modern hypothesis tests* (2nd ed.), Mahwah, NJ: Erlbaum.
- [16] Silverman, D. (2005). *Doing Research: A practical handbook*. CA: Sage.
- [17] Silverman, D. (2005). Analyzing talk and text. In N. K. Denzin and Y. S. Lincoln (Eds.), *Handbook of qualitative research* (2nd ed., pp.821-834) CA: Sage.
- [18] Stake, R. E. (2005). Qualitative case studies, their research approach. In N. K. Denzin & Y. S. Lincoln (eds.) *The Sage handbook of qualitative research* (3rd ed, pp. 443-466). Thousand Oaks, CA: Sage.
- [19] Tedlock, B. (2005). The observation of participation and the emergence of public ethnography. In N.K. Denzin and Y.S. Lincoln (Eds.) *Sage handbook of qualitative research* (3rd ed., pp.467-481). CA: Sage.
- [20] Wills, J. (2005) "Some people even died": Martin Luther King, Jr., the civil rights movement and the politics of remembrance in elementary classrooms. *International Journal of Qualitative Studies in Education*, 18(1), 109-131.
- [21] Yin, R.K. (2008) *Handbook of Applied Research*. CA: Sage.