

Research Methods for Industry Player

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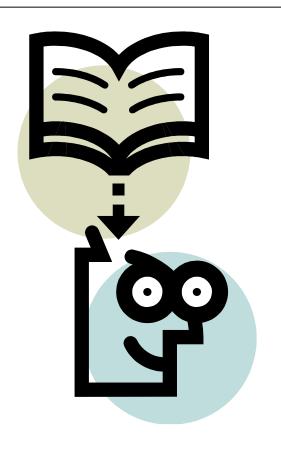
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Terminologies

Methodology – describe and analyze these methods; help to understand the process of scientific enquiry (the overall process to undertake research)

Methods – range of approaches used to gather data; techniques and procedures

Research Methodology in academic research.



Research methodology provides the basis to make informed decisions, step by step, about how the research should be conducted.

Why research?

ACADEMICIANS

The changing nature of environment, surrounding, social economic & human life styles leads to someone questioning the phenomena.

There appears to be an endless requirement to increase the performance of life from many aspects (Remenyi et. al, 1998).

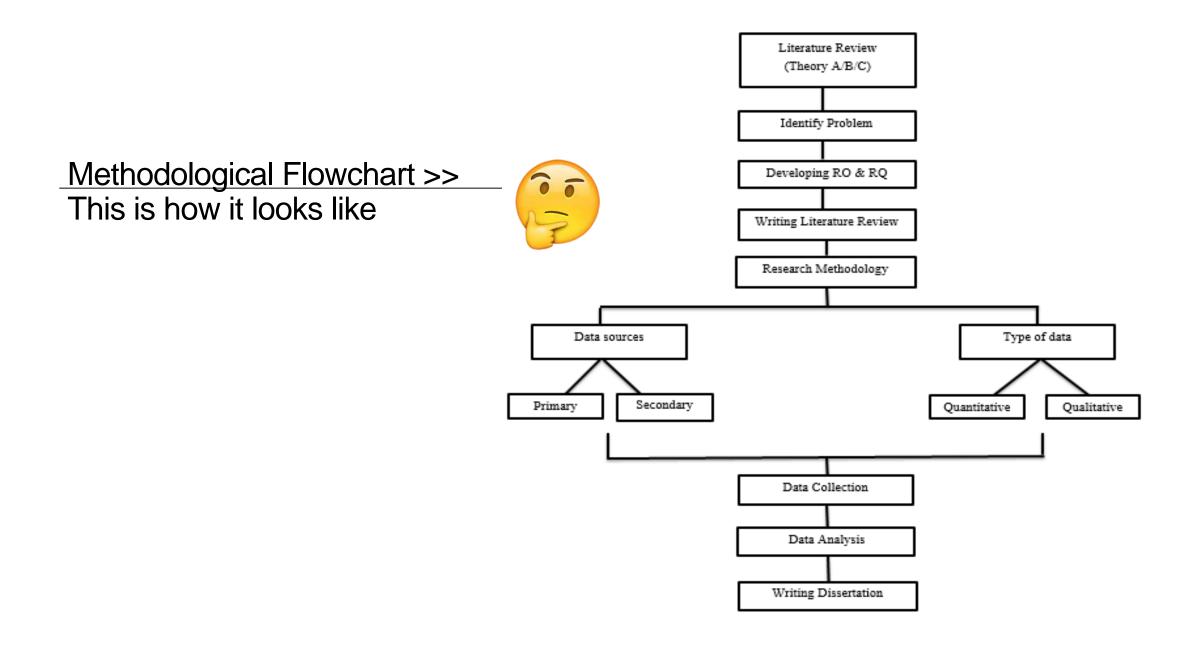
Preparing a report (a written published document)

PRACTITIONERS

R&D is the part of a company's operations that seeks knowledge to develop, design, and enhance its products, services, technologies, or processes.

Along with creating new products and adding features to old ones, investing in R&D connects various parts of a company's strategy and business plan, such as marketing and cost reduction.

Preparing a report



"Data is useful information that you collect to support organizational decision-making and strategy".

THE COUNCIL ON QUALITY AND LEADERSHIP (CQL, US)

Why data is important?

- To solve problems
- Make Informed Decisions
- Back Up Your Arguments
- Having strategic approaches (scientific and/or systematic)
- Utilize your resources
- Get The Results You Want
- Ensure business continuity
- Making profit

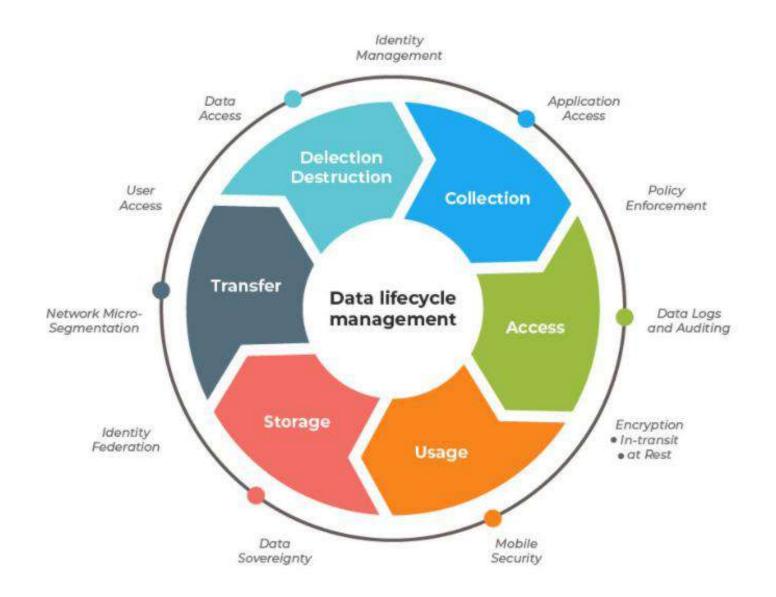
Problem Solving

Problem: Large global organization with fragmented systems and data

Solution: New systems to provide enterprise-wide data for management reporting and analysis

(Laudon 15th ed., 2018)

Data Lifecycle



From DATA to KNOWLEDGE

Knowledge is a firm asset.

- Intangible
- Creation of knowledge from data, information, requires organizational resources
- As it is shared, experiences network effects

Knowledge has different forms.

- May be explicit (documented) or tacit (residing in minds)
- Know-how, craft, skill
- How to follow procedure
- Knowing why things happen (causality)

(Laudon 15th ed., 2018)

What is data and its type?

Data is a set of values of subjects with respect to qualitative or quantitative variables.

Data is raw, unorganized facts that need to be processed.

When **data** is processed, organized, structured or presented in a given context so as to **make it useful, it is called information.**

fundamental distinction between **two types of data**: qualitative and quantitative. The way Typically we define them as **'quantitative' data** if it is in numerical form and **'qualitative'** if it is not.

What type of data?

QUANTITATIVE

The nature of data:

Realism (real fact to everybody)

Objective measures? (Facts & figures? Experiment? Simulation?)

Can be scientifically proven

QUALITATIVE

The nature of data:

Idealism (not pre-determined, but socially constructed)

Subjective measures? (socially constructed based on knowledge gathered by examining/exploring with structured approaches

Customer satisfaction

Are you going to <u>measure</u> customer satisfaction level? **OR**

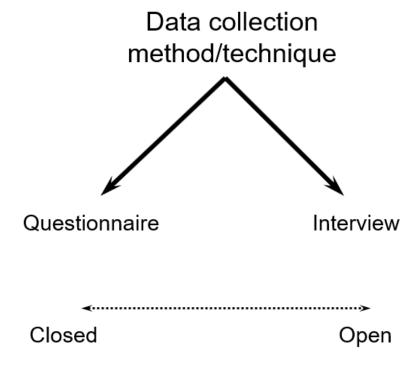
Are you going to seek what complaints are most made by customers? **OR**

The reason why such complaints are made

OR you need both type of data to help you better understand your customer!



How to collect data?



open ended (anything goes) allow for unexpected revelations

closed ended >interviewee must choose between fixed alternatives

closed ended

a. b.

C.

open ended

Data sampling

QUANTITATIVE DATA

Three fundamental steps:

- i. Identify a population
- ii. Define the sample size
- iii. Select the sample

QUALITATIVE DATA

Researchers in qualitative research select their participants according to their :

- i. characteristics
- ii. knowledge
- iii. specific experience

Examples of Quantitative Methods: Questionnaire

- <u>Type of questions</u>: Likert-scale questions, yes/no or true/false, multiple choice, rank in order
- <u>Phrasing the questions</u>: reading complexity, leading questions, loaded terms, too much question in one sentence, middle position (such as 'neutral' in Likert-scale)
- <u>Question sequence and length</u>: inclusion of introductory and closing statement, optimum length of the questionnaire, question sequences (not a sensitive question in the early part of the questionnaire for instance)
- <u>Pre-test and revision</u>: the use of pilot questionnaire to improve the questionnaire (clarity, phrasing, etc.)
- <u>Response rate</u>: try to get prior commitment to participate (pilot can be useful), an effective cover letter, consider giving incentives, final package (cover letter, questionnaire, any incentives, self-addressed-stamped envelope), follow ups

Quantitative data analysis

SUMMARIZING NUMERICAL DATA

- Mean: merely the "average" of a set of data
- Median: the value in the centre of the data-set when they're arranged from the smallest to the largest
- Midrange: observing the middle value between the lowest and the highest values in the data set
- Mode: the value that occurs more than once and the most often

ANALYZING NUMERICAL DATA

- <u>Standard Deviation and Variances</u>: measures the variation of the samples about the sample mean (i.e. a measure of variation that indicates the typical distance between the data and the mean)
- <u>Rank analysis</u>: Kruskal-Wallis, Spearman Rank Correlation, Friedman test
- <u>Inferential methods</u> (deriving conclusions about a population by collecting a sample): Confidence interval, hypothesis testing, ANOVA, chi-square.
- <u>Correlation</u>: measuring the strength of the relationship between the dependent variable and the independent variable

Examples of Qualitative data









INTERVIEW TRANSCRIPT

FIELD NOTE

OBSERVATION

PICTURE



CUSTOMER COMPLAINT



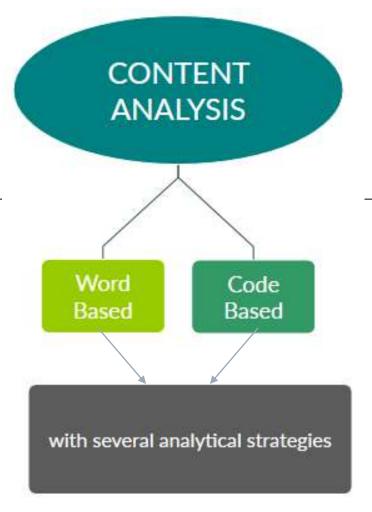
VIDEO



DOCUMENT

Qualitative data analysis

 How can the 'winnowing' process be done from the qualitative raw data?



- ➤ Display data/data display,
- ➤ Identify codes,
- ➤ reduce information,
- >count frequency of codes,
- >relating categories

Analyzing data - Coding process

(Krippendorf, 2004)

Highlight the text that provide the info and assign it as a code (code-based approach) are always before our eyes (increased and the property of the part of the property of the property of the property of the providing of the previously unnoticed aspects of our surroundings in the present moment, rather than inwards toward thinking, prior to any action, as what features we should approach or address in our inquiries. This, clearly is a very different kind of goal from the theoretical goals pursued in the classical, metaphysical philosophies of the past. Instead of providing preliminary theories or models as to the nature of the world around us and our knowledge of it, his aim is to alert us to what in actual fact is occurring in our own involvements with each other, and with our surroundings, which make such theorizing possible. Thus his kind of philosophy "simply puts everything before us, and neither explains nor deduces anything. Since everything lies open to view there is nothing to explain, for what is historical possible before all new discoveries of inventions" (no. 126).

And it is precisely this that I will try to explore further below. For, as we shall see, common both to action research and to the conduct of classical (experiment and theory based) scientific research, is a realm of creative human activity to do with the possible establishing of new human communities. Within this sphere, people develop, not only new ways of relating themselves to each other, but also as a result, new ways of relating themselves to all the other othernesses in their surroundings as well. Thus central in this realm, although so far very little examined in the philosophy of science, is the choice of what we might call the styles of address adopted by members of a research community, both to each other and to the othernesses constituting the subject matter of their research.

In this respect, Kuhn (1970) has noted that, prior to the conducting of the relevant experimental manipulations and the observing of their consequent results (or in the course of such activity), a new scientific community of researchers, all able to communicate in unconfused, nonmisleading ways amongst themselves about unique possibilities not yet actualized, must be established. Hence, he observed: "Effective scientific research scarcely begins before a scientific community thinks it has acquired firm answers to questions like the following: What are the fundamental entities of which the universe is composed? How do these interact with each other and with the senses? What questions may be legitimately be asked about such entities and what techniques employed in seeking solutions?" (Kuhn, 1970, pp.4-5). In other words, the claimed truth of scientific results established experimentally rests in fact on particular sets of sureties or certainties of practice established prior to, or progressively clarified in the course of, the relevant research activities — our scientific truths are grounded in these certainties (Wittgenstein, 1969).

These sureties or certainties of practice, the social rootings of our scientific claims to truth, and the styles of address upon which they depend, have, usually remained in the background unexamined in our studies of the nature of scientific research. The outstanding practical successes of the natural sciences, achieved with very little examination of the role of such sureties¹, have instead been taken as a general guarantee of the efficacy of its methods. As a result, we have no way of checking whether the sureties of our research practices are in fact as well grounded in reality as we believe.

This leaves us in the position of being no more sure as to whether our "relational experi ments" in establishing new research communities in the natural sciences, are any more intellectually well justified than any of our other 'relational experiments'. Thus, at least in this respect, action research would seem so far to be at least as well gro unded – or more accurately, no less well grounded – the natural sciences. Indeed, if the initial establishment of a new research community, just as much as in an action research project, and what we have learnt" (Bohr, 1963, p.3, quoted in Stapp, 1972, p.1106, my emphasis).

"Heisenberg: I'm a photon. A quantum of light. I'm despatched into the darkness to find Bohr. And I succeed, because I manage to collide with him... But what's happened? Look – he's been slowed down, he's been deflected! He's no longer doing exactly what he was so maddenly doing before I walked into him! Bohr: But, Heisenberg, Heisenberg! You also have been deflected!... The trouble is knowing what's happened to you!" (Frayn, 2000, p.69).

Action research is often criticized either for not being properly scientific, or for not being proper research, or both (Toulmin, 1996). My purpose in this paper, however, is to show that inquiries in participatory action research draw on the same processes of human communication and interaction as those in fact used in natural sciences, when viewed as unfinished, unsettled research sciences. This is because, prior to, and during the conduct their experimental manipulations and the making of their observations, a community of scientific researchers must all be able to communicate amongst themselves in nonmisleading, observations ways about uniquely new possibilities not requires orientation more toward imagining and grasping new possibilities than toward understanding current actualities, and members must fashion between themselves new shared or sharable sense of how they might as a teacher to the control of the control of

Data Display/identify codes/reduce information/count frequency of codes/relating categories (data matrices & pattern matching)>>>This manual analysis needs to be understand to relate with Qualitative software analysis such as Nvivo.

Themes	Interview Questions	Code (interpretation)	Interview statement
Social Purpose	What is your view in social purpose?	Community alignment	When we use the <u>organisation</u> given them responsibility to manage, we ask them to do the work accordingly, helps us monitored all activities, this approach succeed.
	\	Community participation	They can cooperate with each other, they know their responsibilities and know how to manage.
	How it might benefit the community?	Self-belonging	I think it is alright, because organisation knows what they want, what community needs, because they are within the community and can fulfil the needs depending on their income, so they don't use it for their own benefit but it is solely for the profit that is used back for the community.
	Developing	Community empowerment	They can cooperate with each other, they know their responsibilities and know how to manage.
	'code'	Thi	s highlighted content process called

Qualitative data analysis – example of interview analysis

	Interviewee 1	Interviewee 2	Interviewee 3
Issue A	1A	2C	3B
Issue B	1B	2A	3C
Issue C	1C	2B	ЗА

<u>Summaries</u>			
Issue A	1A + 2A + 3A		
Issue B	1B + 2B + 3B		
Issue C	1C + 2C + 3C		

- Summarising each codes (thematic)
- Establishing relationship between the issues (if there's any)
- Develop a model to illustrate the relationship

Example of analysis on customer complaint, analyze manually or using a software?

Complaint Barriers for Dissatisfied Customers	Strategies to Reduce These Barriers		
Inconvenience Hard to find right complaint procedure Effort involved in complaining	Put customer service hotline numbers, e-mail and postal addresses on all customer communications materials		
Doubtful Pay Off > Uncertain if action will be taken by firm to address problem	 Have service recovery procedures in place, communicate this to customers Feature service improvements that resulted from customer feedback 		
Unpleasantness ➤ Fear of being treated rudely ➤ Hassle, embarrassment	 Thank customers for their feedback Train frontline employees Allow for anonymous feedback 		

Comparison between manual content analysis process with Nvivo software

Summary of analysis done using Nvivo

Example of the content analysis process



	Community Safety & Security					
	Crime Protection & security	Periodic police patrols	CCTV at strategic location			
Case A	Persatuan penduluk selalunya kami pusing ronda malam minggu saja	Penting, polis memang kena bantu kita sama-sama ronda	Patut kena ada pemantauan			
Case B	Kami kat sini sama-saha dengan JAIS, mencegah nahi mungkar sambil meronda	Kalau boleh nampakyang polis tu memang ada lalu kerap, baru kita rasa selamat	Ada CCTV kat tempat awam, mungkin Majlis boleh keluarkan duit			
Case C	Orang tua ni ranai yang tinggal berdua dengan suami ataulisteri masing- masing, tapi ada juga yang tinggal sendiri	Polis tak cukup kakitangan agaknya	CCTV membantu, sebab ada orang perhati je apa kita buat kan			
1	eloping 'code' to develop Main ne & Sub-Theme	This process cal develop/assign '	led 'coding' in order to 'Code'			

https://www.planningmalaysia.org/index.php/pmj/article/view/417

Note: You can refer to this open access journal paper to get some idea on the analysis done and how its being transformed into final findings.

Ethical consideration in data collection

Patton (2002) offered a checklist of general ethical issues to consider, such as:

- Reciprocity (exchanging things with others for mutual benefit)
- Assessment of risk
- Confidentiality,
- Informed consent
- Data access and ownership.

Personal Data Protection Policy

(Revised 1st June 2017)

At Tenaga Nasional Berhad (Company No. 200866-W), and our subsidiaries, we are committed to protecting your privacy in accordance with the Personal Data Protection Act 2010 of Malaysia ("PDPA"). This Policy explains:

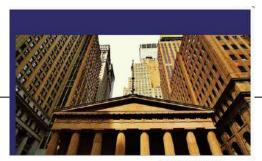
- the type of personal data we collect and how we collect it
- how we use your personal data
- the parties that we disclose the personal data to; and
- the choices we offer, including how to access and update your personal data.

Personal Data We May Collect from You

We may collect the following personal data about you:

- personal information to establish your identity and background such as your full name,
 passport or identity card number, nationality and religion
- contact information such as billing address, premises address for electricity supply,
 telephone number, mobile phone number, fax number and email address
- payment information such as your debit or credit card information, including the name of cardholder, card number, billing address, expiry date and other bank account details

Books so far...



Social Enterprise Applications in Urban Facilities Management Setting

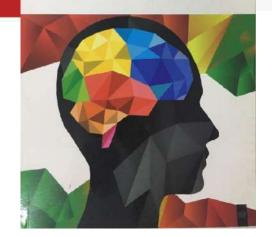
A Service Delivery Model

LAMBERT



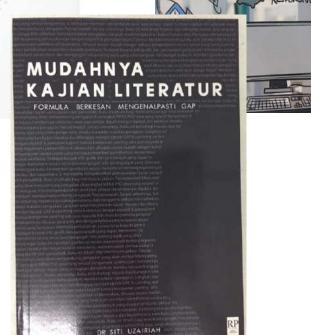


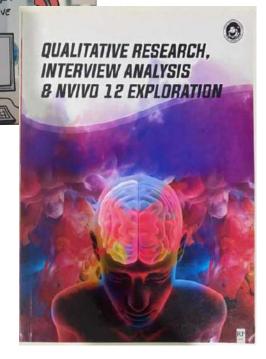
QUALITATIVE RESEARCH, INTERVIEW ANALYSIS &NVIVO 11 EXPLORATION





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My social media platform







