

Quantitative and Qualitative Research in Management (and Computer Science)

Prof. Dr. Roger Moser

*Professor, University of St.Gallen &
Founding Board Member, Timor Foundation*

✓ **FOCUS**

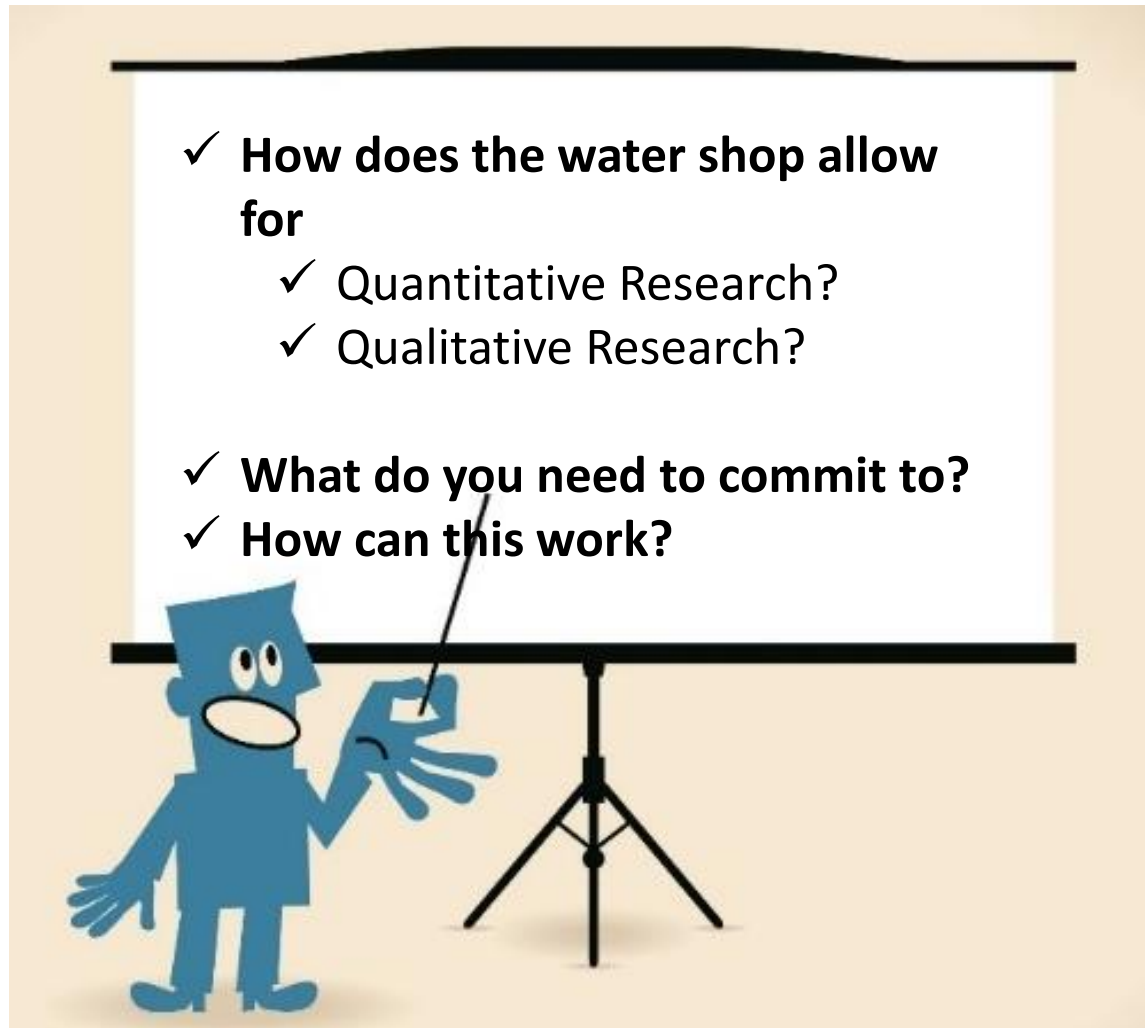
Quantitative & Qualitative Research: Questions.

- ✓ **What are your specific objectives?**
- ✓ **What are your experiences in**
 - ✓ Quantitative Research?
 - ✓ Qualitative Research?
- ✓ **What do you need the research primarily for?**



✓ FOCUS

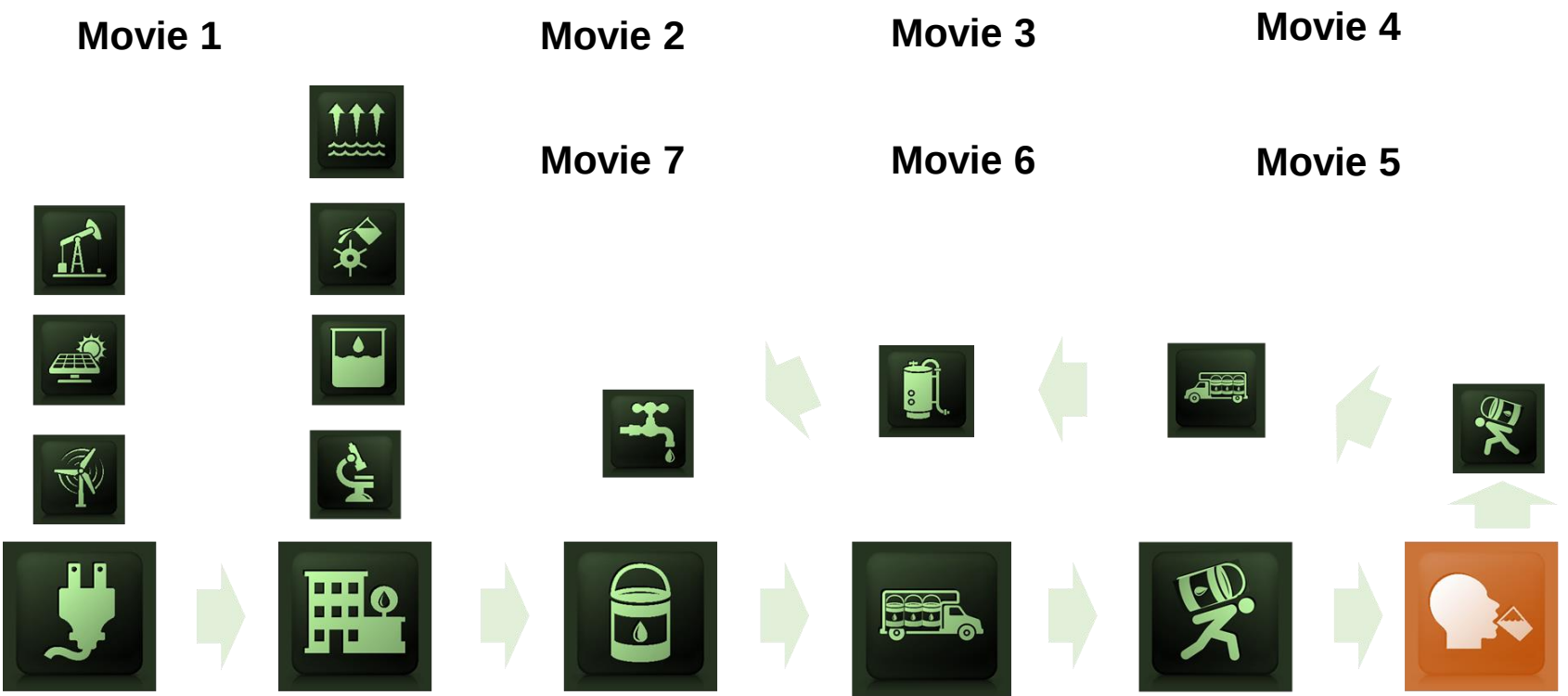
Quantitative & Qualitative Research: Leveraging the Water shop.



✓ **Background:** How does your waters shop work?



✓ **Background:** How does your waters shop work?



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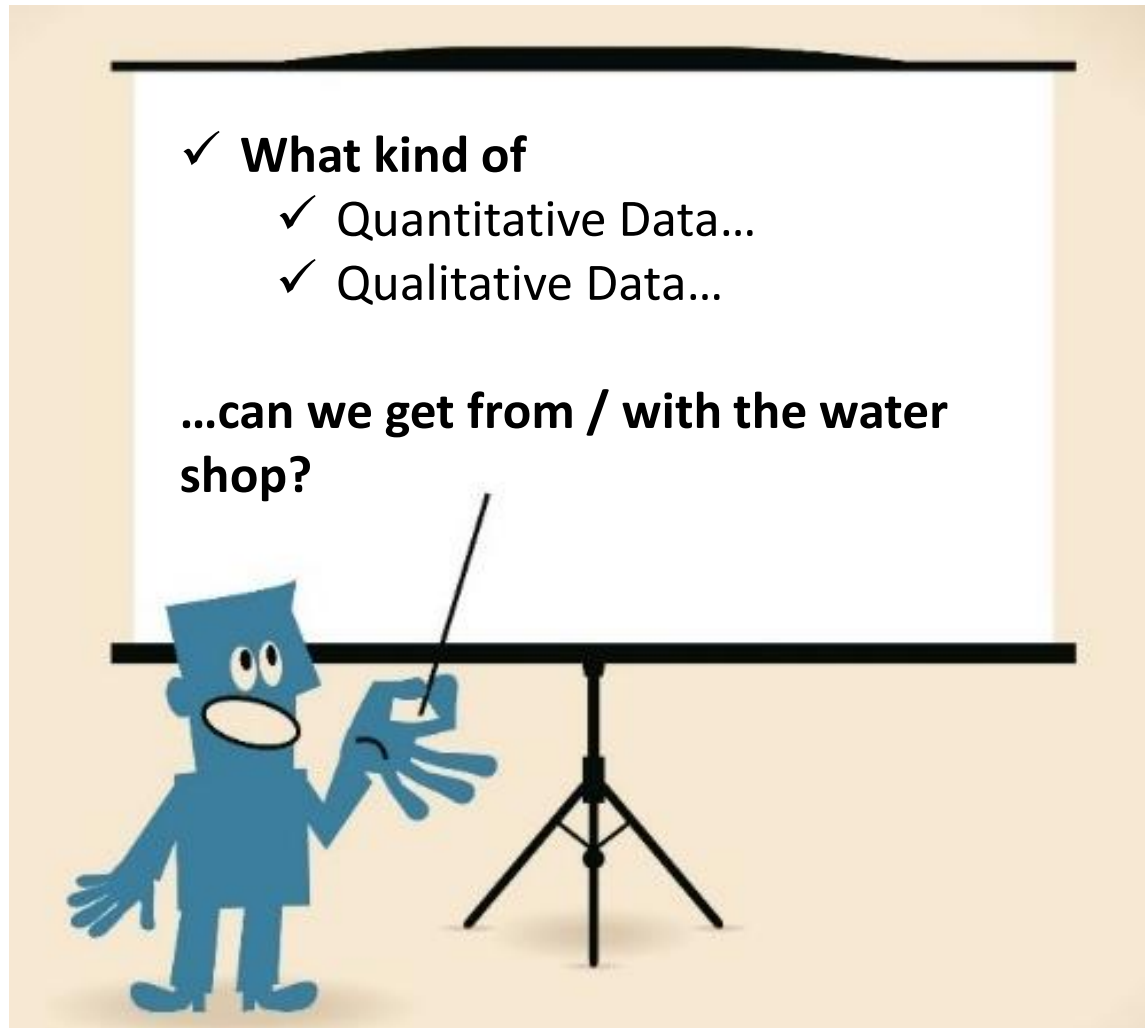
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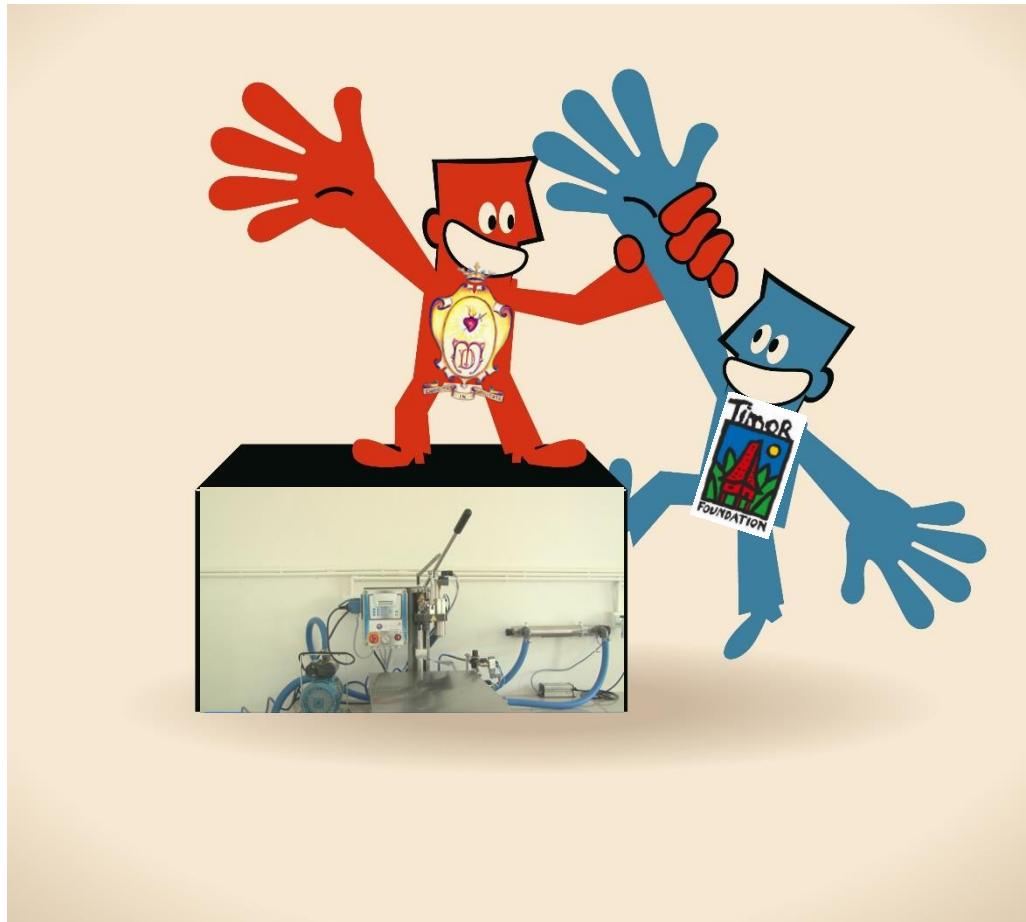
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Quantitative & Qualitative Research: What is the value of the Water shop?



- ✓ **WATER SHOP:** It has TWO values:
 - 1) Saving money & creating income
 - 2) **Offering valuable data**



HOW?

✓ QUALITATIVE RESEARCH

Case Studies for Research

- An Introduction -

Prof. Dr. Roger Moser
University of St.Gallen

Agenda.

- Introduction to case study topic
- Discussion of research case study methodology
- Teaching case studies – an overview
- Developing teaching case studies

References.

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What is a case study?

Research Focus

A case study is an empirical enquiry that investigates a contemporary phenomenon within its real life context, when the boundaries between phenomenon and context are not clearly evident, and in which multiple sources of evidence are used

(Yin, 1989)

- ⇒ Research methodology with strict structures.
- ⇒ Examines a real life situation / phenomenon.
- ⇒ Evidences must come from more than one source.

What is a case study?

Teaching Focus

A case study is a written description of a situation that a decision maker faced at some point in time. Based on real (business) situations in real organizations, case studies allow participants to build skills through a simulation-type process, by giving them an opportunity to identify with the decision maker's dilemma.

(Following Benson, 1984)

- ⇒ Depiction of a real situation comprising a problem or decision.
- ⇒ The reader is stepping into the role of a particular decision maker.
- ⇒ Authentication is an important aspect.
- ⇒ Following the specific purpose, the content and structure of case studies vary.

Case studies can be used as a pedagogical and as a research tool.

■ Case studies as a **pedagogical tool**...

- ...are used to explore and understand the way in which different situations and circumstances evolve over time.
- ...present a framework for discussion and debate.
- ...train participants for practice by developing their analytical and reasoning skills.
- ...support participants in identifying the important issues and problems in their search for a solution.

■ Case studies as a **research tool**...

- ...are used to establish valid and reliable evidence.
- ...synthesize evidence in such a way as to produce a theoretical conjecture or to support or contradict an already established theory.
- ...help researchers to answer why and how questions.
- ...support researchers to develop a convincing argument as the basis for contributing to the body of existing knowledge in a given area.

Discussion: what is case study research good for?

?

What do we really know about our research topics? (Anecdote from research practice)

- Executive: *"Some (other) type of professor is over here again from the USA wanting to interview us about strategy. He had a long questionnaire with containing about fifty different factors. He wants to find out which factors are important when we decide to enter a new market."*
- Researcher: *"What are these factors?"*
- Executive: *"Just the usual sort of thing – market potential, competition, political stability, etc."*
- Researcher: *"What did you reply?"*
- Executive: *"Well, you know, you go through the list and tick off a few factors, show him some marketing plans, and then send him off to meet a few other people. I have no idea what he gets out of it all."*
- Researcher: *"You don't seem too enthusiastic about his research."*
- Executive: *"No, it doesn't really work like that in practice, does it? Let me tell you what happened when we decided to enter a country in Latin America. Four of us got together over dinner in New York: a divisional director, the vice president of R&D, a department head, and myself. We sat together and chatted around the problem but just couldn't agree. In the end we had to take a vote: two in favor, one against, and one undecided. Well, that was it; we went in. Two men flew down on the following Thursday to check the lay of the land."*
- Researcher: *"Did you tell the professor about all this?"*
- Executive: *"Of course not! He might have thought that we are not serious."*

Research case studies: misconceptions related to the use of this research approach.

- Case study research and teaching with case studies are the same.
- The case study method is a purely qualitative research tool.
- The case study method is an exploratory tool that is appropriate only for the exploratory phase of investigation.
- Each case study represents the equivalent of one research observation. Thus, extremely large numbers of case studies are required to produce any meaningful results.
- Case studies do not use a rigorous design methodology.
- Anyone can do a case study, it's just an ad hoc method.
- Results based on the case study methodology are not generalizable.

Source: Ellram, 1996.

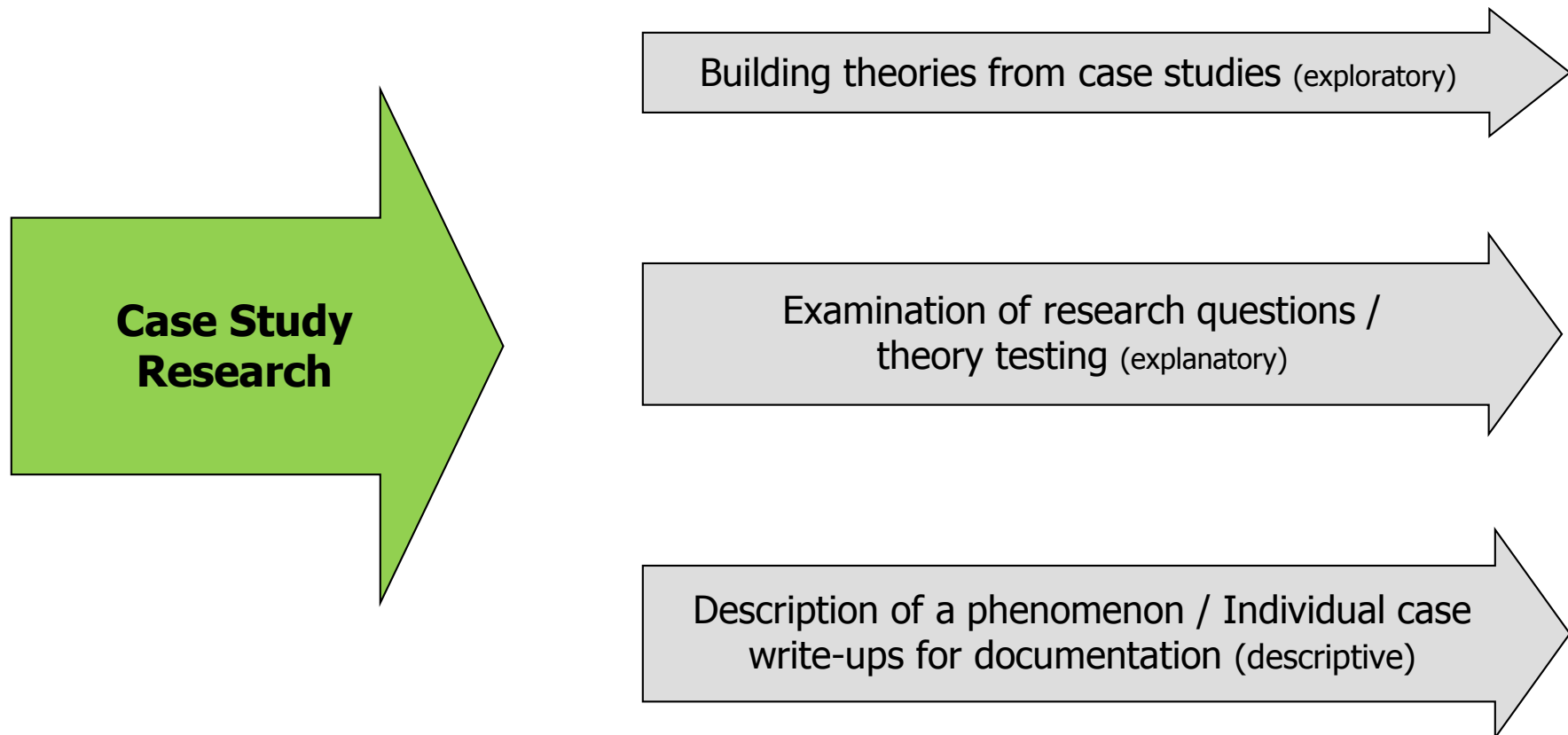
Integration of case study approach in research methodologies.

Types of Analysis

		Primarily Quantitative	Primarily Qualitative
Types of Data	Empirical	Survey data, secondary data in conjunction with statistical analysis such as: -Factor analysis -Cluster analysis -Discriminant analysis	Case Studies, participant observation ethnography-characterized by: Limited statistical analysis, often non-parametric
	Modeling	Simulations Linear Programming Mathematical Programming Decision Analysis	Simluation Role Plays

⇒ Case studies may be used to create theory to then test with surveys, or as follow up to surveys to provide greater insight. The appropriate research method to choose from depends upon the researcher's goal and the nature of the research question.

Case study research can be used to accomplish various objectives such as the generation of theory, the test of theory or the description of a phenomenon.



Building theories from case studies is possible to a certain extent.

Step	Activity	Because...
Getting Started	Decision of research question Possibly a priori constructs	...it focuses efforts ...it provides better grounding of construct measures
Selecting Cases	Neither theory nor hypotheses Specified population Theoretical, not random sampling	...it retains theoretical flexibility ...it constrains extraneous variation and sharpens external validity ...it focuses efforts on theoretical useful cases - i.e. those that replicate or extend theory by filling conceptual categories
Crafting Instruments & Protocols	Multiple data collection methods Qualitative and quantitative data combined Multiple investigators	...it strengthens grounding of theory by triangulation of evidence ...it provides a synergistic view of evidence
Entering the Field	Overlap data collection and analysis, including field notes Flexible and opportunistic data collection methods	...it fosters divergent perspectives and strengthens grounding ...it speeds analyses and reveals helpful adjustments to data collection ...it allows investigators to take advantage of emergent themes and unique case features

Source: Eisenhardt, 1989.

Building theories from case studies is possible to a certain extent (continued).

Step	Activity	Because...
Analyzing Data	Within-case analysis Cross-case pattern search using divergent techniques	...it gains familiarity with data and preliminary theory generation ...if forces investigators to look beyond initial impressions and see evidence through multiple lenses
Sharpening Hypotheses	Iterative tabulation of evidence for each construct Replication, not sampling, logic across cases Search evidence for "why" behind relationships	...it sharpens construct definition validity and measurability ...it confirms, extends and sharpens theory ...it builds internal validity
Enfolding Literature	Comparison with conflicting literature Comparison with similar literature	...it builds internal validity, raises theoretical level and sharpens construct definitions ...it sharpens generalizability, improves construct definition and raises theoretical level
Reaching Closure	Theoretical saturation when possible	...it ends process when marginal improvement becomes small

Source: Eisenhardt, 1989.

Strengths and weaknesses of theory generation from case study research.

■ Strengths

- **Likelihood of generating novel theory**

Creative new insights often arise from the juxtaposition of contradictory or paradoxical evidence because it makes the unfreezing of common thinking easier.

- **Testability of emergent theory**

The new theory is likely to be testable with constructs that can be readily measured and hypotheses that can be proven false. Since constructs and hypotheses have already been measured during the theory-building process, they have already undergone repeated verification.

- **Empirical validity of resultant theory**

The likelihood of valid theory is high because the theory-building process is so intimately tied with evidence.

■ Weaknesses

- **Overcomplexity**

The intensive use of empirical data can yield to overly complex theory. Due to a lack of methods such as multiple regression it is difficult to differentiate between important and idiosyncratic issues/relationships.

- **Mid-range theories**

Case study research bears the risk that the developed theory describes a very specific phenomenon and is not suitable to raise it to a high level of generality.

The examination of theory through case study research should follow a structured approach.

■ I. Definition of examination goals

- Definition of research questions
E.g. Understanding why and when companies use total cost of ownership models.
- Statement of purpose
E.g. The purpose of this study is to assess the state of TCO practice and implementation among U.S. firms using TCO modeling today, with the goal of educating and easing the implementation process of other firms interested in TCO implementations.
- Unit of analysis
E.g. a firm that has implemented and utilized a TCO system.

■ II. Methodology/case study design

- Multiple case study design
Most often 6-10 case studies are enough.
Each case study is an experiment and not a single response to a survey.
- Sample selection
E.g. firms known to be using some form of TCO modeling

The examination of theory through case study research should follow a structured approach (continued).

■ **II. Methodology/case study design (continued)**

- Basic outline of overall case study report
- Pilot study

It is not a pretest but should help to refine data collection

- Collecting evidence

There are three essential ideas:

- Multiple sources of evidence – any 2 or more sources converging on some facts
- Case study data base – make information traceable
- Chain of evidence that links questions asked, data collected and conclusions drawn

■ **III. Data analysis – overall project**

- Pattern matching/comparison
- Explanation building

The examination of theory through case study research should follow a structured approach (continued).

■ **IV. Proposal case study format – individual case write-ups**

e.g. for TCO

Background on company

History of TCO

Sample of TCO model used

Update/maintain TCO model

TCO model uses

Firm's accounting systems

Evolution of TCO over time

■ ***V. Time table of research project***

Description of a phenomenon.

- Research case studies can also be used to describe who, what, where, how and why.
- Holistic understanding vs. reductionistic understanding -> is the whole more than the sum of its part?
 - The detailed observations entailed in the case study method enable us to study many different aspects, examine them in relation to each other, view the process within its total environment and also utilise the researcher's capacity to "really understand"!
 - Case study research provides the researcher with a greater opportunity than other available methods to obtain a holistic view of a specific research issue.
- Quinn (1980) developed teaching case studies for each of the firm in his study of strategic decision making as a prelude to this theoretical work
(Quinn, James B.: Strategies for change. Homewood, IL, Irwin 1980).
He followed the saying "only if you can teach it – you have understood it!"

Research design quality.

- Good case study research design requires external and internal validity, reliability and construct validity

Tests	Construct validity	Internal validity	External validity	Reliability
Tactic to improve case study research quality	• Use multiple sources of evidence • Establish chain of evidence • Have key informants review draft case study report	• Do pattern-matching • Do explanation-building • Address rival explanations • Use logic models	• Use theory in single-case studies • Use replication logic in multiple-case studies	• Use case study protocol • Develop case study data base
Phase of research in which tactic occurs	Data collection	Data analysis	Research design	Data collection

Source: Gummesson, 2000 / Yin, 2003.

Summary.

- The specific case study research approach depends on the researcher and his/her objectives.
 - Exploratory
 - Descriptive
 - Explanatory
- There is no common accepted set of guidelines that assesses case study research from a scientific point of view.
 - Validity and reliability are difficult to measure precisely in case study research since the qualitative assessment is largely the product of the interaction of the researcher with the phenomenon.
 - Validity and reliability often lie in the qualification of the researcher. Nevertheless, there exist defined guidelines and approaches that ensure high scientific standards
- The best approach for doctoral students is to rely on one of the standards developed by some accepted case study researchers.

✓ QUANTITATIVE RESEARCH

✓ STUDY EXAMPLE

EXECUTIVE SUMMARY:

The India Competence Center at the University of St.Gallen has recently conducted a study with low-income groups in semi-urban India (study location: Udaipur / more than 130 participants) about their perception of the benefits and risks of water filter solutions (i.e. to get clean drinking water) in the form of two possibilities:

- **Possibility A (OWNERSHIP):** Ownership of an individual water filter @HOME to produce clean drinking water
- **Possibility B (ACCESS):** Access to clean drinking water via an “access-based” business model that allows people to have an individual water filter at home but not be the owner. The solution of Jivana Vitaliy represents a further extension of the evaluated access-based business model.

✓ STUDY EXAMPLE

The study has evaluated the perceived risks and benefits of the OWNERSHIP of a water filter (*Possibility A*) and the ACCESS of a water filter (*Possibility B*) out of the perspective of the interviewed low-income groups.

The results of exhibit 1 confirm that people from lower income groups in semi-urban India (such as Udaipur) show the following behaviour

- **USAGE/PURCHASE INTENTION:** People from lower income percentiles have a higher usage potential of access-based solutions over the ownership of water filters at home. Only people from the highest income percentile prefer ownership over access-based solutions.
- **LIVELIHOOD IMPROVEMENT:** People from lower income percentiles perceive a higher livelihood improvement through access-based solutions compared to the ownership of individual water filters.
- **FINANCIAL RISK:** People from lower income percentiles perceive the ownership of individual water filters at home as much riskier from a financial perspective compared to access-based solutions. Only the highest income percentile does not make a difference between ownership and access.
- **PERFORMANCE RISK:** All people interviewed in this study confirm that the ownership of individual water filters reveals a higher performance risk compared to access-based solutions.
- **SOCIAL RISKS:** Access-based solutions reveal a constantly higher social risk (e.g. to be perceived as poor) for all interviewed persons. Such a result is to be expected.

✓ STUDY EXAMPLE

Exhibit 1: Study results (Ownership vs. Access-based Solution)

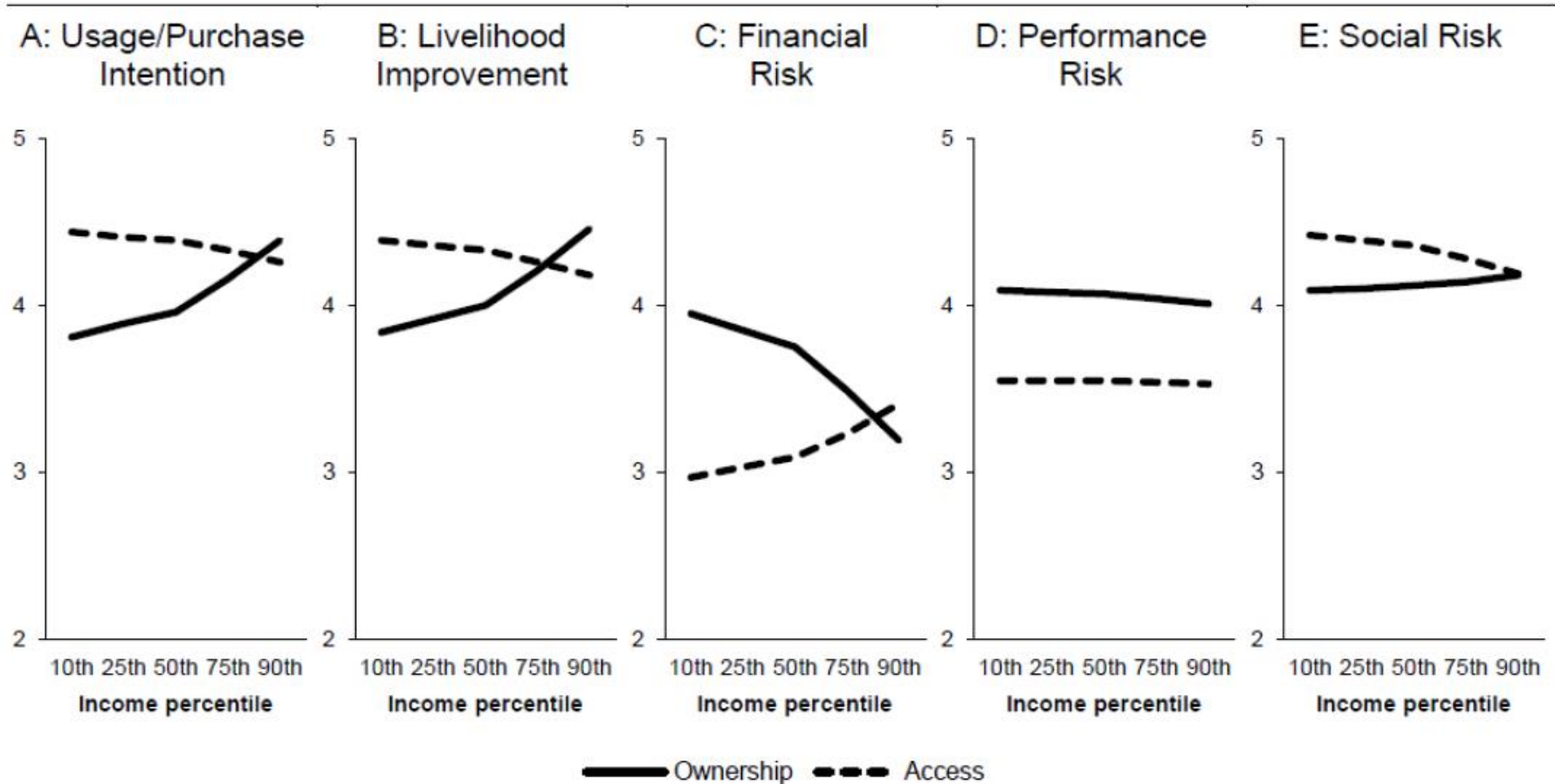
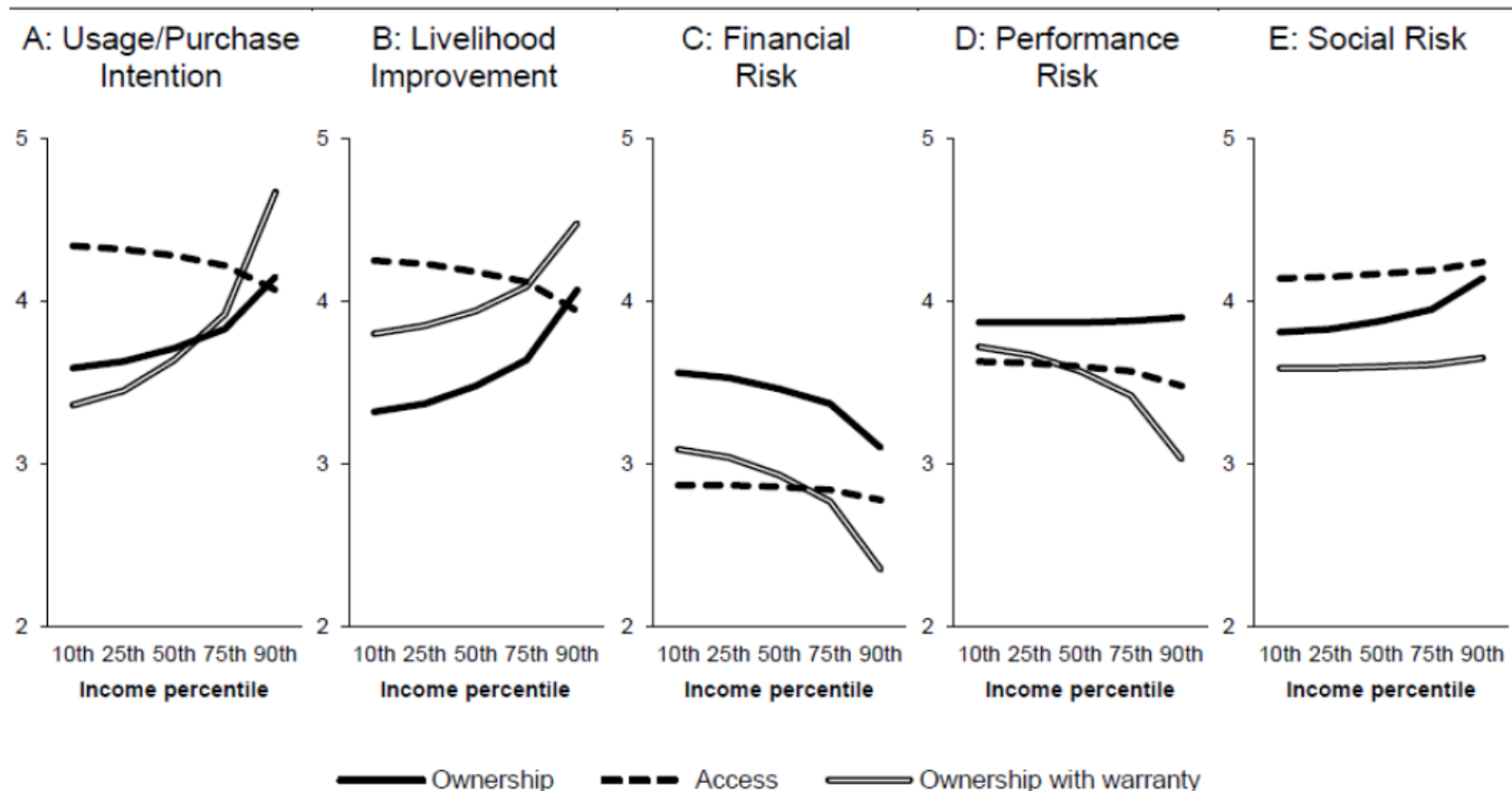


Exhibit 2 shows the results of another study conducted with the same low income groups in Udaipur (but different people) including a solution that provides a WARRANTY option for the ownership of a water filters at home.

The results are as expected and do not change the basic insights as listed above.

Exhibit 2: Study results (Ownership & Ownership with Warranty vs. Access-based Solution)



IMPROVING the ACCESS to CLEAN DRINKING WATER: Questionnaire

Dear Sir/Madam

Thank you for your willingness to participate in our survey *on improving access to clean drinking water*. IIM Udaipur in collaboration with the University of St.Gallen in Switzerland and IIM Kozhikode try to develop new solutions to provide people in Udaipur with cheap and safe access to clean drinking water.

Therefore, we are interested in your preferences and experiences with access to clean drinking water. There are no wrong or right answers in this questionnaire. All your experiences and preferences are valuable to us

In the following, we will ask you different questions regarding your preferences and experiences with respect to the access to clean drinking water. Please carefully examine all information provided and ask your contact if you have any questions. We would then kindly ask you to answer the questions. It is important that you simply answer as good as you can – again, there are no right or wrong answers and we value all your input.

Some of the questions may seem quite similar. This is intentional and necessary.

Thank you very much for your support.

Prof. Dr. Roger Moser

Adjunct Professor of Management, IIM Udaipur
Visiting Faculty, IIM Bangalore
Professor of International Management, University of St.Gallen

Gopalakrishnan Narayanamurthy

Fellow (Doctoral) Program in Management (FPM)
Indian Institute of Management Kozhikode (IIMK) Kerala, India.

0.	I am the primary decision maker for the water supply in my home ☐ YES ☐ I have a strong influence ☐ NO
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IMPROVING the ACCESS to CLEAN DRINKING WATER – RESEARCH STUDY

[Group A = Ownership & Village-Level Entrepreneur]

SITUATION A

Please read the following situation description carefully and answer the questions based on your preferences and experiences.

Situation A:

astro Pure Plus is run by Sanjay, an individual entrepreneur in your village that offers water filters to produce clean drinking water. You can buy a water filter from him and put it in your home. You know the family of Sanjay quite well as he and his family live in your village.

The price for the water filter system called “*Pure Plus Gold*” is Rs. 2550 INR and has a storage capacity of 20 liters. The actual filter has to be replaced after 4000 liters and costs 1500 INR. No electricity is required to use the water filter.

With your own water filter “*Pure Plus Gold*” that you purchase from Sanjay, the owner of *astro Pure Plus*, you are able to do the following:

- Fill in water from a well or a river or any other water source close to your home
- Filter this water and remove most germs, bacteria, and other ingredients in the water that harm your health
- Improve the taste of your drinking water

Seller / Product



[Purchasing – A & B]

The following questions refer to *astro Pure Plus* as your provider of clean drinking water.

Please indicate how strongly you agree or disagree with each of the following statements.

		totally disagree	disagree somewhat	neither disagree nor agree	agree somewhat	totally agree
1.	I trust this brand.	☐	☐	☐	☐	☐
2.	I would rely on this brand.	☐	☐	☐	☐	☐
3.	This is an honest brand.	☐	☐	☐	☐	☐
4.	This brand is safe.	☐	☐	☐	☐	☐

The following questions refer to your opinion about clean drinking water.

Please indicate how strongly you agree or disagree with each of the following statements.

		totally disagree	disagree somewhat	neither disagree nor agree	agree somewhat	totally agree
5.	Considering the investment involved, purchasing a water filter is risky.	☐	☐	☐	☐	☐
6.	Given the financial expenses associated with purchasing a water filter, there is substantial financial risk.	☐	☐	☐	☐	☐
7.	I would worry about the cost of purchasing a water filter.	☐	☐	☐	☐	☐
8.	Given the financial commitment, I may regret purchasing a water filter.	☐	☐	☐	☐	☐
9.	I could lose a significant amount of money if I ended up with a water filter that didn't work.	☐	☐	☐	☐	☐
10.	Due to the financial commitment, I am unlikely to buy a water filter.	☐	☐	☐	☐	☐
11.	I am certain that a water filter would work satisfactorily.	☐	☐	☐	☐	☐
12.	I am likely to have problems with the performance of this water filter.	☐	☐	☐	☐	☐
13.	If a water filter malfunctions, the consequences can be fairly severe.	☐	☐	☐	☐	☐
14.	Buying the wrong water filter can lead to very negative consequences.	☐	☐	☐	☐	☐
15.	I need to be careful when buying a water filter since a lot can go wrong when you use it.	☐	☐	☐	☐	☐
16.	If I buy a water filter, other people are likely to evaluate my purchase.	☐	☐	☐	☐	☐
17.	Before buying a water filter I would consider what others would think about	☐	☐	☐	☐	☐

	my purchase					
18.	If I buy a water filter, other people will ask me questions about it	☐	☐	☐	☐	☐
19.	Other people will judge me depending on the water filter I purchase.	☐	☐	☐	☐	☐
20.	If I buy a water filter, I will probably have to explain to some people how I chose it.	☐	☐	☐	☐	☐

The following questions refer to your attitude toward *astro Pure Plus* as your provider of clean drinking water.

astro Pure Plus is...

21.	...bad	☐	☐	☐	☐	☐	...good
22.	...poor quality	☐	☐	☐	☐	☐	...high quality
23.	...useless	☐	☐	☐	☐	☐	...useful
24.	...unconvincing	☐	☐	☐	☐	☐	...convincing
25.	...worthless	☐	☐	☐	☐	☐	...valuable
26.	...negative	☐	☐	☐	☐	☐	...positive

[Water Filter – A, B, C, D]

The following questions refer to *astro Pure Plus* as your provider of clean drinking water.

Please indicate how strongly you agree or disagree with each of the following statements.

		totally disagree	disagree somewhat	neither disagree nor agree	agree somewhat	totally agree
27.	I can imagine using an <i>astro Pure Plus</i> water filter.	☐	☐	☐	☐	☐
28.	I plan to use an <i>astro Pure Plus</i> water filter in the future.	☐	☐	☐	☐	☐
29.	I intend to use an <i>astro Pure Plus</i> water filter in my everyday life.	☐	☐	☐	☐	☐

The following questions refer to *astro Pure Plus* as your provider of clean drinking water.

Please indicate how strongly you agree or disagree with each of the following statements.

		totally disagree	disagree somewhat	neither disagree nor agree	agree somewhat	totally agree
30.	An <i>astro Pure Plus</i> water filter would make my life better.	☐	☐	☐	☐	☐
31.	An <i>astro Pure Plus</i> water filter would improve	☐	☐	☐	☐	☐

	my well-being.					
32.	I would be able to lead a better life with an <i>astro Pure Plus</i> water filter.	☐	☐	☐	☐	☐
33.	Using an <i>astro Pure Plus</i> water filter would make me happier.	☐	☐	☐	☐	☐
34.	An <i>astro Pure Plus</i> water filter would allow me to enjoy life more.	☐	☐	☐	☐	☐
35.	Using an <i>astro Pure Plus</i> water filter would make me feel better.	☐	☐	☐	☐	☐
36.	An <i>astro Pure Plus</i> water filter will allow me to stay healthy.	☐	☐	☐	☐	☐
37.	An <i>astro Pure Plus</i> water filter will prevent me from being affected by viruses and bacteria.	☐	☐	☐	☐	☐
38.	My health will improve when using an <i>astro Pure Plus</i> water filter	☐	☐	☐	☐	☐
39.	When using an <i>astro Pure Plus</i> water filter I will not become ill	☐	☐	☐	☐	☐
40.	The medical expenditures of my family will decrease considerably when using an <i>astro Pure Plus</i> water filter	☐	☐	☐	☐	☐
41.	When using an <i>astro Pure Plus</i> water filter I am not prone to water borne diseases	☐	☐	☐	☐	☐
42.	By using an <i>astro Pure Plus</i> water filter, I feel better in hygiene than my neighbors who lack such a water filter	☐	☐	☐	☐	☐
43.	By using an <i>astro Pure Plus</i> water filter, I have no fear of getting infected	☐	☐	☐	☐	☐
44.	I see <i>astro Pure Plus</i> water filter as a preventative measure to reduce the incidence and spreading of disease	☐	☐	☐	☐	☐
45.	An <i>astro Pure Plus</i> water filter ensures my bodily health and well being	☐	☐	☐	☐	☐
46.	An <i>astro Pure Plus</i> water filter prevents me from getting in contact with the hazards of wastes in the normal water	☐	☐	☐	☐	☐
47.	An <i>astro Pure Plus</i> water filter provides best sanitation practice as it ensures personal cleanliness	☐	☐	☐	☐	☐
48.	By using an <i>astro Pure Plus</i> water filter, I am confident of preventing diseases such as typhoid, cholera, diarrhea and dysentery.	☐	☐	☐	☐	☐
49.	An <i>astro Pure Plus</i> water filter helps me in preventing skin disorder, mouth & body odor, and tooth decay.	☐	☐	☐	☐	☐

IMPROVING the ACCESS to CLEAN DRINKING WATER – RESEARCH STUDY

Please indicate how strongly you agree or disagree with each of the following statements.

		totally disagree	disagree somewhat	neither disagree nor agree	agree somewhat	totally agree
A	The questionnaire was easy to understand.	☐	☐	☐	☐	☐
B	The situation described in the beginning of this questionnaire was realistic.	☐	☐	☐	☐	☐

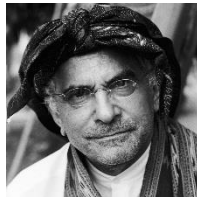
Please answer the questions below.

C	Regarding the advertised <i>astro Pure Plus</i> clean water offering, customers can (choose one)...
	☐ ...purchase, own and use it. ☐ ...use it without owning it (paying a monthly fee). ☐ ...have the water regularly delivered to my home.
D	The advertised <i>astro Pure Plus</i> Clean Drinking Water Solutions is being offered by...
	☐ ...a large corporation. ☐ ...an individual entrepreneur.
E	How old are you?
	_____ years
F	What is your gender?
	☐ Male ☐ female
G	What the average monthly income of all the people that you live together?
	_____ INR
H	How far away is your water source (e.g. well, river etc.)?
	_____ Meters

✓ Contact?



Prof. Dr. Roger Moser
University of St.Gallen (HSG)
ASIA CONNECT Center-HSG
Dufourstrasse 40a, 9000 St.Gallen, Switzerland
www.acc-hsg.org / www.acc.unisg.ch
Roger.Moser@unisg.ch



Dr. José Ramos-Horta
President of the TIMOR FOUNDATION



Ms. Barbara Lietz
CEO of the TIMOR FOUNDATION
Rua Sergio Vieira de Melo, Farol, Dili, Timor-Leste
www.timor-foundation.com
info@timor-foundation.com