Research & Design Methodology Industrial Engineering and Management Year 2, 2021

Notes based on lectures and book chapters

Includes:

Chapter 1: Project Design Chapter 2: Research Objective Chapter 3: Research Framework Chapter 4: Research Questions Chapter 5: Defining Concepts Chapter 6: Research Strategies Chapter 7: Research Material Chapter 8: Research Planning Appendix: Conceptual Model Systems Thinking

Research & Design Methodolog Chapter 1: Project Design	7 Objective Project conte
Designing Research Conceptual Design	7 Objective Project conte
Research Flamework what are the reserven	8 sub questions
what are the reserven	Research Questions
Technical Research design	Research Perspective
How where, when? conceptual	Model [
2 parts of Project Design:	theoretical Framewar
Conceptual Design determing what you	want to achieve
consist of 4 eler	vents
1) Resparsh Objective (ocal of the research): the	e contribution the research
wishes to make to solve a problem lexternal	aim). It concerns the
use of knowledge produced. Derived & ember	olded into Project Context
2) Research Framework schematic representation.	of the imp research phases
3) Research Questions the answers to these ques	
to answer the research oppective linternal a	aim). Determining which
, theoremal framework, to use (Besearch)	
Stakes form in the conceptual mode	1) -set of assumed relationsh
WDefining and Operationalising: set of activities in	which core concepts an
defined, refined and made concrete.	the second s
Technical Research Design How to realise	the above during the
implimentation stage of the project (How,	where, when?)
DResearch Strategy: breadth or depth? quant	itive or qualitative?
2) Research Material data gathering > how ca	n data be produced?
3) Research Planning. time schedules with deadling	les for products/deliverables
Chapter 2: Research Objective	
Project context! the subject of the research p	project is carefully define
and empedded in the waler context (project a	ontext), usually it is a sel
of problems. If too wide -) solation is neede	d.
Step by skep approach.	
Step 1. Onentation	
Theory onented: the project is made up of p	rocess and product of
knowledge formation within the held of resea	rch (
types: theory development, theory testing, empin	al curle scientific method
practice onented? the project context is a practical pr	obtem in a private / public
Organization	and the second house
Hypes: intervension yore, problem solving yore	and the second

Step 27 explore project context by anwening: I What problems are involved within the project context 2) What is the background to these problems? 3) What solutions are stakeholders considering? Step 3 Determine type of research Step 4. Formulate the research objective An effective research objective should be: Usefull, Realistic, Frankle The research objective is (2) by (realising, Clear & informative providing.) (b) (step 5) a: theory example: to further develop theory x of author y, dealing with issue 2 plactice example: to help improve the existing policy & dealing with issue 2 b. theory example: by lesting a set of nypotheses, deduced from theory x practice example. by making a companison between. Step 6: Check if research objective calls for reorientation Why people fail to find effective such ons, - way to tackle: 1) Being NOT being methodical A proper problem 2) lack of commitment to save problem 3 Misinterpretation problem statement Slatement 4) lack of knowledge of techniques & processes invalued 5) Using inpappiophate methods 6) Insufficient and inaccurate information to combine analytical thinking Problem statement . Its purpose is to lows the attention of problem solving team "It is a concise description of issues to be addressed before solving the problem . III - defined problems are complex because it is difficult to define each element of the problem space For theory onented research. Repeater Read -Discuss -> Report-For practice opented research? Whent-Why analysis Up > brodeler problem: Why do we want to save this problem? Down > narrower problem: what is stopping us hown solving problem? For both Stakeholder cinalysis > f Fishbone diagram g subject Players E croud context setters, power SMART Objective. specific, measurable, attainable, relevant, time-bound

Chapter 3' Re	search Framework
	La schematic representation of the research objective
	and includes appropriate steps that need to be taken
	in order to achieve it.
Step by step	
	ctense research objechve
and and the state of the state	nine the object or objects of the research project
ordanizing dev	theory frevaluation criteria = Reserved Respective
theory on farm	
	Ladmin writerit party = Research object
pretiminary rese	
	of: the phenomena in empirical reality that you are going to study
	proposed to study this object from a resourch perspective
	the nature of the research perspective
	eveloping) theory oriented
· Theony te	
· Problem a	naujsing
· Diagnostic	
· Design one	nkd research
· Intervention	D-Dnenled research
Step 4. Determi	
Choose the	relevant literature by making a first setection of scientific
articles and	reports, and/or outline preliminary research, noting which
experts to a the research	onsult have there choices on the key concepts extracted from objective.
Step 5 make	a schematic presentation -> 3 steps to achieve this
1) The compan 2) lables are p	ents of the research Gramework are represented (short lables)
3) All Gamewi confrontat	orks are interconnected depending on the recipical
Step 6% Formul	ate the research framework
Arst phase: st	wras
second phase; hu	which research objects the research perspective is applied
thing phase. "	n what way the individual texatch objectives may be related state research objective

Chapter 115	Decorate Operation		

Hapter 4. Research Questions
which is the mountaine that is useful & relavent to admitted
the research objective, may be unraverled with subquestions
TVILDOD REQUIRE REPORT
the relief the dealer of knulledge that yields the course to the
questions contained & the degree to which the knowledge contributes
to ansurate the respiration objective
Steering capasity extent to which the set of RQ sheds light on the
achilles that need to be performed.
> Descriptive knowledge: statements such as how reality is or what
It looks like or how things work are descriptive statements
-> Explainatory knowledge: statements about why things are the way
they are belong to explanatory statements.
April now can' questions
Rois are focussed on the internal goal to achieve the external goal
Form Requirement? central question and subquestions
Central Question What is needed to achieve research objective
Sub questions. What knowledge is needed to answer central avestion
Skp by step approach?
research framework corrobative types unravelling core
of knowledge concepts
research objective tone questions sub-questions
) Central Question (2 methods)
1) Subdivinging research Framework
2) I dentifying corrobative types of knowledge
-> decide what types of knowledge islare relevant for RO
> formulate one or more control questions of this type of knowledge
that play an immediate corrobative role in realising RO
2150b-Questions
1) corrobative types of knowledge
Stor each central question and the corrobative knowledge and
formaulate sub-as of this type of knowledge.
2) up ravelling key concepts
= select key concepts
-> use tree diagram, onravel each concept into its components
-> select aspects from the diagram on the basis of feasibility of the
research and formulate sub Q from each component

Corrobotat	we types of knowledge!
Discriptive	knowledge 4) Evaluative knowledge
2) Explainato	ry knowledge 5) Prescriptive knowledge
3) Predictive	knowledge
if central is e	
	should be discriptive role to create lower ranked knowledge
Chapter 5: D	Defining concepts
The significa	nue you attribute to they key concepts will strongly
	the type of material you need to gather
	Idn't be post-poned.
	stipulative definitions
	Anition dehnition in which a new/existing term is given
	a new specific meaning.
Conditions	to be met:
	g the concept to manageoble propultions
17 Hh	ie action of describing or patraying something precisiey
eq. R	Lavens, are black,
	lomain assertion Size = DXA
	the question of which observable entrities are covered by the definition
Steps: Diselect	indicators
2) Define	instruments and instructions -> Quantative/Qualitative
3) Creat	e an operational definition
3) Inking up	to the research objective and the set of reversion analysis
the aenniho	A much relate the selected research objective and the set
of helearch	apertions pertaining to the research project
In every reser	erch project additions concerning age and sex are required.
	· · · · · · · · · · · · · · · · · · ·
Appendix: CC	inceptual Model
A set of as	sumed causal relationships between core concepts
TOURCHILD	of a conternal model
consists of 2	sets of etements
1) cone conce	pts phenomena that occur in different variations or modalities
THE TOTAL	NOTIFICIAL DAY FOR THE FORM OF
Incavanin	or grocolling - vanishon can be described as more as loss
h wh	en there is distinct categories
	J

2) Relationships We define a relationship between 2 variables X and Y as a capital one if we assume, as a result of a manipulation of X, a change In y will occur. Direction: positive or negative causal effect Sthength: range from no effect, weak effect to strong effect Basic patterns of causal relationships UDIRECT Effect influence of x on Y YE 2) Indirect effect : influence of X on Z, which effects Y > Z -> Y Z: intervening vanable 3) Interaction effects: Z interacts with the effect of X on Y Y Z'interacting variable 4) teodback Effect. Direct Feedback effect: Indirect feedback effect $X \longrightarrow Y$ 5) confounding effects. Z is the confounding vanable causing the spunces relationship between X and Y Zy Different uses of the conceptual model Quantatative research: prefer concepts to have narrow & closed meaning Qualitative research prefer concepts to have global & broad meaning Testing vs. Exploration Testing: distil from existing knowledge a conceptual top model, and check whether the relationships in the model are not falsified by empirical data Exploration: 1) Porther ellaborate the conceptual model 2) start with a generic, more abstract model Demarcation and steering? · A well-thoughtout and well-demarcated set of core concepts forms the basis of a successful research project The designing process of a conceptual model starts by defining a generic conceptual model the next steps involve a wither specification of this generic model. The process ends with the construction of the final conceptual model including the formation of assumed

Interpreting approach Legoring suchal chimips Slexearch findings compiled in tables, chaits number calculations SI Empirical research is Desk research make use of existing interature or data gathered by others SDD research in the held, gathering data themselves to make judgements based on the analysis of this data Other devisions? Number and type of research units Method of unit selection Choice of sources and method to open op sources way to process and method to open op sources Sourcey breadth, quantitative, empirical, theory/practice chentated Vanents: Cross-sectional research, panel research, Time-series research Adiantages large 2019, large availibrity methodological handbooks Disodiantages infled depth, no complete overiew. less flexible Disodiantages they acate and validity Disodiantages external validity, not all intervention an teramed a Vanents: Inde generical validity, not all intervention an teramed a Vanents: single asses today, complicative cale study Advantages gan general picture, no pre-sourcing regured, todats avery Advantages and general validity, other under pressure Disodiantages external validity of the under study Advantages and general picture, no pre-sourcing regured, todats avery Advantages and general validity of the under pressure Disodiantages external validity of the under pressure	Chapter 6 Research strakgles > decisions concerning	now to do texauch
Hat an begeneralized to a tester extend A large scale approach that enables a generalization of results. (Auanthative vs Qualitative > a more contemplative with = pretease interpreting approach (reporting-veilal timemplation) Presearch findings compiled in tables, dualts number calculations Presearch findings compiled in tables, dualts number calculations Presearch in the held, gathering data themselves to make judgements based on the analysis of this data Whethed of unit selection Choire of sources and method to open up sources way to process duals and literative yer strategies Survey bleadth, quantitative, empirical, theory/practice constants Northoges large soft, or ge availability methodological handbooks Discolvantinges large were internal valued alway 2 groups - expensional internal and control group Vanents, lab expensional valuative, empirical, theory practice constated Wanthages large soft, or ge availability Discolvantinges, large were internal valuative alway 2 groups - expensional internal valuative alway 2 groups - expensional valuative vanents, lab expensional valuative, empirical, theory onented alway 2 groups - expensional valuative promany context and control group Vanents, lab expensional valuative, empirical, theory onented valuationes; thigh degree internal valuative Advantages, external valuative, empirical, theory onented valuationes; thigh degree internal valuative Advantages, gain general pretive, no pre-surving toured, touch accepted ex- Discolvantages, external valuative, empirical, theory- onented Vanents, single case study, comparising toured, touch accepted ex- Discolvantages, gain general pretive, no pre-surving toured, touch pressure) Groundext theory approach ground active empirical, theory-onented (haraclenstrics inquisitive, continuous proass, casely conside we procedures primary/secondary empirical comparison of preserved primary/secondary empirical comparison of preserved primary/secondary empirical comparison of preserved	Breath is Depth tam for small-scale approach	n that yields knowledg
⁵ A bige scale approach that enables a generalization of results. (Quantitative vs Qualitative > a more contemplative with a prefeate interpreting approach (reporting-vertal*unimple >Research findings compiled in tables, chaits number actuations) (Empirical research vs Descreasarch > make use of existing interative or data gathered by others >Do research in the held, gathering data themselves to make judgements based on the analysis of this data Other deusons? Number and type of research units Method of unit selection Choice of sources and method to open op sources way to process data and literative you strutges? Strutegies Strutegies Strutegies Lissearch and the depth, no compile avery. Its's floatble Descriptional research and control group Vaneths table depth, no compile avery. Iss's floatble Disodiationes: thigh cleare internal validity, not all intervention an terained a Charles thigh cleare internal validity of an termed a Maintages: thigh cleare internal validity, not all intervention an terained a Charles thigh cleare internal validity of a united barles Disodiationals: and patient validity, not all intervention an terained a Charles thigh cleare internal validity Disodiationals: and picture, no pic structure from an terained a Charles: single ase structy, compiliative cale structy Advantages: gain gereal picture, no pic structuring injured, testista average a Disodiational cale picture, no pic structure pressure Charles theory application of the structure pressure Charles theory application of the structure pressure Disodianticages: external validity often under pressure Consorted theory application of the structure pressure Charles theory application of the structure pressure Disodianticages: external validity often under pressure Charles theory applicating wean	that can be generalized to	a lesser extend
Interpreting applicant terporting suchal to the primary interpreting applicant terporting suchal to the primary interaction of th	">A large scale approach that enables a ge	neralization of reluits
→ Research findings compiled in tables chaits number calculations) Empirical research is Desk research make use of existing literature or data gathered by others → DD research in the held, gathering data themselves to make judgements based on the analysis of this data Iter devolops? Number and type of research units Method of unit selection Choile of sources and method to open op sources way to process and method to open op sources way to process and method to open op sources way to process and and literature yor strategies Sourcey breadth, quantitative, empirical, theory/practice chentated Vanents. Cross-sectional research, panel research, Time-series research Adiantages large vole, large availability methodological handbodes Disodiantages. Limited depth, no comprete overvew. less flexible Disodiantages. High depth, no comprete overvew. less flexible Nument quantitative, empirical, theory/practice chentated alway 2 groups → experimental and control group Vanents. Tab experiment, Quasi-experiment. Imitation Adviantages. High degree internal validity Disodiantages. Engle case study, comparative care study Adviantages. gain general picture, no pre-succing regioned, results accepted es Disodiantages. external validity other under pressure (haraclenstics inquisitive, collinuous process, cated on hard a character picture, no pre-succing regioned, results accepted es Disodiantages. external validity other under pressure (haraclenstics inquisitive, collinuous process, cated on the picture, results accepted es Disodiantages. external validity other under pressure (haraclenstics inquisitive, collinuous process, cated ones is even and pinnary/secondary empirical comparison of Parial coding) Quantitative vs. Qualitative ? a more contemp	lative with 3 preferable
 Statement is best research intervention on the second in the field, gathering data themselves to make judgements. based on the analysis of this data Statement in the field, gathering data themselves to make judgements. based on the analysis of this data Statement and type of research units. Number and type of research units. Notice of sources and method to open up sources. Way to process data and literature. May to process data and literature. May to process data and literature. Sourcey: breadth, quantitative, empirical. theory/practice orientated variables. Cross-sectional research, panel research and control group. Nonent: quantitative, empirical, theory/practice constated alway. 2 groups → experimental and control group. Nament: algo degree internal variatity. Nonents: bab experiment, Quasi-experiment. Imitation Advantages. external variatity, not all intervention an terained a list of the data data. Naments: single case straty. comparative case straty. Advantages. gain general picture, no pre-structuring regured, results accepted ess. Disodiantages. external variative, empirical, theory-onented. Advantages. gain general picture, no pre-structuring regured, results accepted ess. Disodiantages. external variative, empirical, theory-onented. Advantages. gain general picture, no pre-structuring regured, results accepted ess. Disodiantages. external variative, empirical, theory-onented. Advantages. external variative, empirical, theory-onented. Advantages. external variative, empi	interpreting approach	[reporting=verbal & concomptat
data garheret by others Do research in the heid, garhering data themselves to make judgements based on the analysis of this data We despense Number and type of research units Method of unit setection Choice of sources and method to open op sources Way to process data and literature you strategies Survey to process data and literature you strategies Disadualtages large scope, losing availing methodological handbooks Disadualtages limited depth, no complete over www. less flexible Disadualtages ligh degree internal validity Disaavantages external validity, not all intervention an te amed a (ase Study depth, qualitative, empirical, theory onented Vanents: Single ase study, comparative are study Advantages, gain general picture, no pre-stracturing repured, touts acepted eas Disadvantages, external validity often under presure Disadvantages, external validity often under presure Disadvantages external validity often under presure	-> Research hindings compiled in tables, charts nu	mber cakulanons
 Do research in the heid, gathening data themselves to make judgements. based on the analysis of this data Other decisions? Number and type of research units Method of unit setection Choice of sources and method to open up sources Way to process acta and literature Mor strategies Sourcey! breadth, quantitative, empirical, theory/practice orientated Vanents: Cross-sectional research, panel research, Time-series research Advantages. large supe, large availient? methodological handbooks Disadvantages: limited depth, no comprete overvew. less flexible Disadvantages: High depth, no comprete overvew. less flexible Vanents: Lab experiment, Quasitative, empirical, theory/practice orientated alway 2 groups -> experimental and control group Vanents: Lab experiment, Quasitative, empirical, theory oriented Vanents: Single case study, comparative care study Advantages: gain general picture, no pre-structuring repured, tesuts acepted eas Disadvantages, external validity often index presive Groundust theory approach or presence of picture, empirical, theory oriented (haraclenstics: inquisitive, confinuous proves, cuery indicative oriented indicative endities indicative endities or procedures primary/secondary empirical comparison of pictures provedures primary/secondary empirical comparison of pictures is a per cell 	b) Empirical research vs Desk research ? Make use of ex	Dring meanure or
based on the analysis of this data Ther devolops: Number and type of research units Method of unit selection Choice of sources and method to open op sources Way to process acts and literature you strategies Survey: breadth, quantitative, empirical. theory/practice orientated Vanents: Cross-sectional research, panel research, Time-senes research Advantages large sope, large availibility methodological handbooks Disadvantages large sope, large availibility methodological handbooks Disadvantages large sope normal, theory/practice orientated alway 2 groups -> experimental and control group Vanents, lab experiment, Quasi-experiment, Imitation Advantages, High degree internal validity Disadvantages, external validity, not all intervention can be carned a lase study depth, qualitative, empirical, theory-oriented Vanents: single case study, comparative care study Advantages, gain general picture, no pre-structuring required, testils accepted eas Disadvantages, external validity, other onvice pressure Disadvantages, external validity, other onvice pressure Charactenstics: inquisitive, continuous praces, cateur/consisted we procedures primary/secondary empirical comparison of Paxial coding	Olata gatherea	by others
 Where decisions? Number and type of research units Method of unit selection Choice of sources and method to open op sources Way to process data and literature Mor strategies Sourcey: breadth, quantitative, empirical. theory/practice orientated Varents: Cross-schunal research, panel research, Time-senes research Adiantages. large sope, large availibrity methodological handbooks Disadvantages limited depth, no comprete averuew. less flexible Sourcey: breadth, quantitative, empirical, theory/practice orientated Adiantages. large sope, large availibrity methodological handbooks Disadvantages limited depth, no comprete averuew. less flexible Sopenment quantitative, empirical, theory/practice orientated alway 2 groups -> experimental and control group Varients. Tab experiment, Quasi-experiment. Imitation Advantages. High degree internal validity Disadvantages. external validity, not all intervention can be carried a Varients: single case study. Comparative care study Advantages. gain general picture, no pre-structuring required, testils accepted eas Disadvantages. external validity often under pristice Chounded theory approach qualitative, empirical, theory-oriented Charackenstics: inquisitive, continuous praces, cateur/consisted we procedures primary/secondary theoretical comparison of piscinsing comparist open cells 	haved any the analysis of the data themselves	, 10 mare Juagements
Number and type of research units Method of unit selection Choile of sources and method to open up sources way to process acts and literature your strategies Sourcey: breadth, quantitative, empirical, theory/practice onentated Varents: Cross-sectional research, panel research, Time-series research Advantages, large xOPE, large availibrity methodological handbooks Disadvantages, large xOPE, large availibrity proved and control group Vanents, lab experiment, Quasi-experiment, Imitation Advantages, High degree internal validity Disadvantages, external validity, not all intervention an the annel a Vanents, single case study, comparative case study Advantages, gain general picture, no pre-structuring required, tosults acepted eas Disadvantages, external validity often onder presive Disadvantages, external validity often onder presive Disadvantages industrive, continuous praess, cardiv unisted we procedures primary/secondary empirical comparison () Paxial coding		
Method of Unit setection Choice of sources and method to open up sources Way to process acts and literature gor strategies Survey breadth, quantitative, empirical, theory/practice onentated Varents: Cross-sectional research, panel research, Time-series research Adiantages large xope, large availability methodological handbooks Disadvantages large xope, large availability methodological handbooks Disadvantages limited depth, no complete overview. less flexible Disadvantages invited depth, no complete overview. less flexible Disadvantages experimental and control group Varents lab experiment, Quasi-experiment. Imitation Advantages High degree internal validity Disadvantages external validity, not all intervention an record a Varents: single ase stray, comparative call study Advantages gain general picture, no pre-structuring required, touts accepted eas Disadvantages, external validity other index pressure Disadvantages, external validity other index frequented Varents: single ase stray, comparative call study Advantages, gain general picture, no pre-structuring required, touts accepted eas Disadvantages, external validity other index pressure Disadvantages, external validity other index pressure Disadvantages external validity offers index pressure primary/secondary empirical comparison of primary/secondary theoretical tomparison of primary/secondary theoretical tomparisons Preserved and theoretical tomparison of Axial coding		
Choice of sources and method to open up sources Way to process data and literature you strategies Survey: bleadth, quantitative, empirical. theory/practice onentated Varients: Cross-sectional research, panel research, Time-series research Advantages. large 2008. Large availability methodological handbooks Disadvantages. large 2008. Large availability methodological handbooks Disadvantages. limited depth, no comprete overview. less flexible Despenment: quantitative, empirical, theory/practice charted alway 2 groups -> expensional validity Varients: lab experiment, Quasi-experiment. Imitation Advantages. High degree internal validity Disadvantages. external validity, not all intervention an terained a Varients: single case study, comparative care study Advantages. gain general picture, no pre-structuring required, results accepted eas Disadvantages. external validity often under pressure Disadvantages. external validity often under pressure primary/secondary empirical comparison of primary/secondary theoretical longarison of Pressing comparison of Pr		
Way to process data and literature yor strategies Survey! breadth, quantitative, empirical, theory/practice orientated Varients: Cross-sectional research, panel research, Time-series research Advantages large sofe, large availibility methodological handbooks Disadvantages: limited depth, no complete overview. less flexible Depenment quantitative, empirical, theory/practice crientated alway 2 groups -> experimental and control group Varients. Tab experiment, Quasi-experiment. Imitation Advantages: High degree internal validity Disadvantages: external validity, not all intervention an the carried a loss study depth, qualitative, empirical, theory-oriented Varients: single case study, comparative case study Advantages: gain general picture, no pre-structuring required, results accepted eas Disadvantages, external validity other under pressure) Groundied theory approach, qualitative, empirical, theory-oriented (haracteristics: inquisitive, continuous process, caread usisted we procedures primary/secondary empirical comparisons of Axial coding		oures
Sourcey: breadth, quantitative, empirical, theory/practice orientated Varients: Cross-sectional research, panel research, Time-series research Advantages large 2009. Large availibility methodological handbooks Disadvantages. large 2009. Journel depth, no complete average of the control group Varients. Lab experiment, Quasi-experiment. Imitation Advantages: High degree internal validity Disadvantages: external validity, not all intervention on the caned a Maximitages: external validity, not all intervention on the caned a Varients: Single case study, comparative case study Advantages. gain general picture, no pre-structuring required, toolts accepted eas Disadvantages. external validity often under presive Disadvantages. external validity often under presive (harackenistics inquisitive, continuous process, cateur/consisted we procedures primary/secondary empirical comparison of the sensing using to pre-sensed primary/secondary empirical comparison of the sensing using to pre-sense		
Advantages large x0PE, large availientig methodologial handbooks Disadvantages limited depth, no complete overvew. less flexible Disadvantages limited depth, no complete overvew. less flexible Disadvantages and control group Vanents lab experiment, Quasi-experiment. Imitation Advantages High degree internal validity. Disadvantages external validity, not all intervention on the control of Vanents' single case study. Comparative case study Advantages gain general picture, no pre-structuring required, results accepted eas Disadvantages external validity often under pressure Scounded theory apploach qualitative, empirical, theory-oriented Charackenstrics inquisitive, continuous process, cateur/ unsisted we procedures primary/secondary theoretical comparison of Axial coding	Motor Strategies	<u></u>
Vanents: Cross-sectional research, panel research, Time-senes research Adviantages large xope, large availibility methodological handbooks Disadviantages limited depth, no complete overview. less flexible 2) Experiment quantitative, empirical, theory practice chentated alway 2 groups -> experimental and control group Vanents. lab experiment, Quasi-experiment. Imitation Advantages: High degree internal validity Disadvantages: external validity, not all intervention on the cantel a Vanents: single case study, comparative case study Advantages: gain general picture, no pre-structiving required, touts accepted eas Disadvantages. external validity often onder pressure Disadvantages. external validity often onder pressure Charactenistics inquisitive, continuous pracess, cateur consisted we procedures primary/secondary empirical comparison of pre-struction of the procedures primary/secondary theoretical comparison of pre-structure of the procedures to per- primary / secondary theoretical comparison of pre-structure of the pre-structure of the primary / secondary theoretical comparison of pre-structure of the primary / secondary theoretical comparison of pre-structure of the pre-s	Survey: breadth, quantitative, empirical. theory/pr	ache onentated
Disadvanlages limited depth, no comprete overview, less flexible Disadvanlages limited depth, no comprete overview, less flexible alway 2 groups -> expensional, theory/practice orientated alway 2 groups -> expensional, and control group Vanents, lab experiment, Quasi-experiment, Imitation Advantages High degree internal validity Disadvantages: external validity, not all intervention on the control of Vanents: single case study, comparative case study Advantages, gain general picture, no pre-structuring required, results accepted eas Disadvantages, external validity often under pressure) Grounded theory approach, qualitative, empirical, theory-oriented Charactenstics: inquisitive, continuous process, cateur unsisted use procedures primary/secondary empirical comparison of the sensitising compositioned primary/secondary theoretical comparison of the Axial coding	Vanents: Cross-sectional research, panel research, TI	me-senes research
() Experiment quantitative, empirical, theory/practice orientated alway 2 groups -> experimental and control group Variells. Lab experiment, Quasi-experiment. Imitation Advantages: High degree internal validity Disadvantages: external validity, not all intervention an teramed a Mass Study depth, qualitative, empirical, theory-oriented Variells: single case study, comparative case study Advantages: gain general picture, no pre-structuring required, results accepted eas Disadvantages. external validity often under pressure (haraclenistics: inquisitive, continuous process, cateur/unsisted we procedures primary/secondary empirical comparison of pressing uniques to per seal		
alway 2 groups -> expensional and control group Vanents. Lab expension. Quasi-expension. Imitation Advantages: High degree internal validity Disodvantages: external validity, not all intervention on the caned a Masc Study depth, qualitative, empirical, theory-onented Vanents: single case study, comparative case study Advantages. gain general picture, no pre-structioning required, results accepted eas Disodvantages. external validity often order pressure Study approach? qualitative, empirical, theory-oriented (haraclenistics inquisitive, continuous process, careful consisted use procedures primary/secondary empirical comparison of pressing comps & open secure primary/secondary theoretical comparison of pressing comps & open secure	Disadvantages limited depth, no comptete overview.	less flexible
Vanens. Tab experiment, Quasi-experiment. Imitation Advantages: High degree internal validity Disodivantages: external validity, not all intervention on the caned a Vanents: Single case study, comparative case study Advantages: gain general picture, no pre-structioning required, results accepted eas Disodivantages. external validity often under pressure Disodivantages. external validity often under pressure) Grounded theory apploach? qualitative, empirical, theory-oriented Characteristics inquisitive, continuous process, categy consisted we procedures primary/secondary theoretical comparison of Axial coding	e) experiment quantitative, empirical, theory pic	ichie on intrated
Advantages: High degree internal validity Disadvantages: external validity, not all intervention on the control of Mase Study depth, qualitative, empirical, theory-oriented Varients: single case study, comparative case study Advantages: gain general picture, no pre-structuring required, results accepted eas Disadvantages. external validity often order pressure Disadvantages. external validity often order pressure (haractenistics inquisitive, continuous process, cateur/consisted use procedures primary/secondary theoretical comparison of pressing compositioned primary/secondary theoretical comparison of pressing compositioned		
Disadvantages: external validity, not all intervention on the control a I Case Study depth, qualitative, empirical, theory-onented Vanents: single case study, comparative case study Advantages: gain general picture, no pre-structuring required, results accepted eas Disadvantages. external validity often under pressure) Grounded theory approach, qualitative, empirical, theory-oriented Characteristics: inquisitive, continuous process, careful/consisted use procedures primary/secondary empirical comparison of pressing comaps & open codu primary/secondary theoretical comparison of Axial coding		100
(asc Study depth, qualitative, empirical, theory-oriented Varients: single case study, comparative case study Advantages, gain general picture, no pre-structioning required, results accepted eas Disadvantages, external validity often under pressure () Grounded theory approach, qualitative, empirical, theory-oriented Characteristics inquisitive, continuous process, careful consisted we procedures primary/secondary empirical comparison of pre-sensitising comaps & open codu primary/secondary theoretical comparison of Axial coding	Disadiantages High degree internal aniang	ation as beaution
Vanents: Single case study, comparative care study Advantages gain general picture, no pre-structuring required, results accepted eas Disodvantages, external validity often under pressure Grounded theory approach, qualitative, empirical, theory-oriented Characteristics inquisitive, continuous process, careful consisted use procedures primary/secondary empirical comparison of pressing compositioner of Axial coding	Las Studie depto availative empirical theory	- onented
Advantages. gain general picture, no pre-structioning required, tesults accepted eas Disodvantages. external validity often under pressure) Grounded theory approach? qualitative, empirical, theory-oriented Characteristics inquisitive. continuous process category consisted use procedures primary/secondary empirical comparison of pressing concept & open codu primary/secondary theoretical comparison of Axial coding	Vonents: single are study comparative rale	study
Disadvantages. external validity often under pressure) Grounded theory approach, qualitative, empirical, theory-oriented Characteristics inquisitive, continuous process, careful consisted we procedures primary/secondary empirical comparison of prensitising compositioner of primary/secondary theoretical comparison of parallelistic coding	Advantages, gain general picture, no pre-structuring no	wined results accepted easie
) Grounded theory approach, qualitative, empirical, theory-oriented Characteristics inquisitive, continuous process, careful consisted use procedures primary/secondary empirical comparison of psensitising compositioners to per code primary/secondary theoretical comparison of Axial coding		
characteristics inquisitive continuous process cateur consisted use procedures primary/secondary empirical comparison of prensitising concept & open codu primary/secondary theoretical comparison of Axial coding) Grounded theory approach? qualitative empirical,	theory-oriented
primary/secondary empirical comparison of sensitising compositioner and primary / secondary theoretical comparison of Axial coding	Characteristics, inquisitive, continuous process, careful	consisted use procedures
consorming of theories deductive of Selective ending	primary/secondary empirical comparison of the ser	Billising concept & open codin ial coding
comparison and inductive comp.	companison of theones, deductive of User	ective coding

Advantage. Used to develop a theory, enables gaining overal view of complex Disadvantage. Disk at any on the organization of the property of t
Disadvantage: Disea to develop a theory, enables gaining overal view of complexity
Characteristics use existing material, no client contact with object, diff perspective for material
-> Secondary data
HOGAN Stalistical masterial
varients: liferature survey secondary recent
Advantage: use of a large amount of data
Disadvarilage: researched used was intended for other purpose, consequences for RO
Chapter 7: Research Material
What kind of material is needed and how and where to gather it. General aspects of research material
Illageneral there is an abundance and diversity of available material to choose from
2) One needs to be resourcefull to come up with interesting material
3) It is nessesary to make choices and delineate the research project
4) Different motives can play a part in making these choices within the
limits of the research goal.
5) There is often a great freedom in choosing from the options awailible
6) The set of (sub) questions can be reddined
7) Designer must be aware of the (dis) advantages
Sources Availible
The Following questions must be answered:
i) what is the main rategories of research objects that can be distinguished
2) What types of information on these objects are relevant to the research
project, and how can this information be identified?
3) Where this information can be gathered or how it can be generated? Source 1. People
advantages: aiversity quice way is garrier in an un participation isteering entry
disadvalltages. Strongly subjective answers, people find it difficult to Source 2. Media -> printed or electronic speak out
avantages. non manual on org, ing or pring and will
advantages: not all research can be inked to relevant media
abuar

Source 3' Reality	W
advantages: di	rect measurements have high degree of objectivity
disduantages: onl	y serve as data source, not knowledge source
Soure 4: Downen	B
advantages: great	quantity, wide variety, inexpensive, little skills needed to use.
durat	de, behaviouval responses are not provoked
	erwhelming amount of information
Source 5 Titerati	
various forms: mo	onographs, editorial volumes, specialist journals, hand tooks
advantages as	a knowledge source it already has insight (no need to start are
as	a data source: researcher doesn't need to go to great length to gatha
disadvantages: ex	clusion of authority & relearcher follows author too closely
Mainly data so	urles. Reople, media, downents, reality
Mainty knowled	ge xources: literature
Accessing sources	Para and a state of the state o
sources	accessing
People	·questioning
media	Dobsenation
reality	pmeascrement instruments
downents	X
hterature ===	Diearch method
"Ucuestioning ->	Poll -> written > Face - to- face
) Oral) By relefone
2	Interview -> By relefone > Individual face-to-face -> Group
Delphi method:	tace-to-face -> Group
resembles a q	soup interview and written poll
2) Gathening ob	ervational data
pancipant obs	ervation: if the researcher participates in daily activities of
the grou	up in order to prevent people from behaving different
IImekeeping	. participants keep track of their own achigher
3) Measurement	Instruments, a mechanism an object or a provodul
by means of	which we can directly arountiful or airiliful about and
4) content Analy	sis generating data from document merlia ventile and like white
D Laran Merrin	us thenny appropriate literature.
- search based	a on key words
- consult labstr	acts) extracts and relieus
- Scheen sheas,	list journals tuse snowbal prouple

Interview vs Dour	
Interview vs Poll	
Advantages	
Advantages: poll is less time consuming	
poil new larger number of research on 10	A
Disadvantages when the deals with more complicated issues	
Disadvantages. Interview has less reach	
reference int. make are less emotionally into	nie
pail has higher non-response rate	<u> </u>
Interview in chances of receiving evasive/strategic answer are	high in question
Interview vs other techniques	
Intensions search and him in the	
Interview: tearn motives of behaviour	
Observation: more suitable to map actual behaviour, nisk of strateg	ficanshers reduce
(onleast analytics will be dish dias does to dish of bids	
Content analysis: little distortion due to strategic answers	Part of the second second
Disaduralization	
Disadvantages	and to ortical beh
Interview: easier to obtain perspectives, memories and intension com interview asomess interviewee an express their thought	s & lealings
Disadvantages Interview: easier to obtain perspectives, memories and intension com interview asumess interviewee an express their thought nisk of strategic answers, natural behaviour interview	s & lealings see is disregarda
Disadvantages Interview: easier to obtain perspectives, memories and intension com interview asomess interviewee can express their thought nisk of strategic answers, natural behaviour interview OFRER little or unreliable information regarding phills	s & lealings see is distegarded
Disadvantages Interview: easier to obtain perspectives, memories and interview of interview asomess interviewee can express their thought nisk of strategic answers, natural behaviour interview Offer little or unreliable information regarding phys Observations: not able to team motives of behaviour, time of	s & lealings see is distegarded
Disadvantages Interview: easier to obtain perspectives, memories and intension com interview asomess interviewee can express their thought nisk of strategic answers, natoral behaviour interview offer little or unreliable information regarding phys Observations: not able to team motives of behaviour, time of controllability of outcome is limited	s & lealings see is distegarded sical & social context onsoming,
Disadvantages Interview: easier to obtain perspectives, memories and interview of interview asomess interviewee can express their thought nisk of strategic answers, natural behaviour interview Offer little or unreliable information regarding phys Observations: not able to team motives of behaviour, time of	s & lealings see is distegarded sical & social context onsoming,
Disadvantages Interview: easier to obtain perspectives, memories and intension com interview asomess interviewee can express their thought nisk of strategic answers, natural behaviour interview Offer little or unreliable information regarding phys Observations: not able to team motives of behaviour, time of controllability of outcome is limited Controllability of outcome is limited	s & lealings see is distegarded sical & social context onsoming, ditting
Disadvantages Interview: easier to obtain perspectives, memories and interview of interview asomess interviewee can express their thought nisk of strategic answers, natural behaviour interview offer little or unreliable information regarding phys Observations: not able to team motives of behaviour, time of controllability of outcome is limited (ontent Analysis: Documents and media are subject to ex- (hapter 8: Research planning > the when and how mission San as 2 items: 1) designing and stimulating tool	s & lealings see is distegated sical & social context onsuming, ditting
Disadvantages Interview: easier to obtain perspectives, memores and intension com intenview asomess interviewee can express their thought nisk of strategic answers, natural behaviour interview offer little or unreliable information regarding phys Observations: not able to team motives of behaviour, time of controllability of outcome is limited (ontent Analysis: Documents and media are subject to ex- (hapter 8: Research planning -> the unen and how mission Seen as 2 items. 1) designing and stimulating tool 2) efficient design -> activity plan & time	s & lealings see is distegated sical & social context onsuming, ditting
Disadvantages Interview: easier to obtain perspectives, memores and intension com interview asomess interviewee an express their thought nisk of strategic answers, natural behaviour interview Offer little or unreliable information regarding physion Observations: not able to team motives of behaviour, time of controllability of outcome is limited (onlent Anelysis: Downents and media are subject to a (hapter 8: Research planning > the when and how mission as a items. i) designing and stimulating tool 2) efficient design > activity plan & time (hapter sol planning)	s & lealings see is distegated sical & social context onsoming, ditting sch
Disadvantages Interview: easier to obtain perspectives, memores and intension com interview asomess interviewee can express their thought nisk of strategic answers, natural behaviour interview offer little or unreviable information regarding phys Observations: not able to team motives of behaviour, time of controllability of outcome is limited (ontent Averitysis: Documents and media are subject to en (hapter 8: Research planning > the unen and now mission as a items. 1) designing and stimulating tool 2) efficient design > activity plan 8 time (naractenistics of planning)	s & lealings see is distegated sical & social context onsoming, ditting sch
Disadvantages Interview: easier to obtain perspectives, memories and intension com interview asomess interviewee can express their thought nisk of strategic answers, natural behaviour interview offer little or unreliable information regarding phys Observations: not able to team motives of behaviour, time of controllability of outcome is limited (ontent the able to team motives) of behaviour, time of controllability of outcome is limited (ontent the able to team motives) of behaviour, time of controllability of outcome is limited (ontent the able to team motives) of behaviour, time of controllability of outcome is limited (ontent the able to team motives) of behaviour, time of controllability of outcome is limited (ontent the able to team motives) of behaviour, time of controllability of outcome is limited (ontent the able to team motives) of behaviour, time of controllability of outcome is limited (ontent the able to team motives) of behaviour, time of controllability of autoing and stimulating tool 2) efficient design is achivity plan & time monor densities of planning panning a research project should be understood as follows an overview of achivities to be carried out (planning process)	s & lealings see is distegated sical & social context onsoming, ditting sch
Disadvantages Interview: easier to obtain perspectives, memories and intension com interview asomess interviewee an express their thought nisk of strategic answers, natoral behaviour interview Offer little or unreliable information regarding phys Observations: not able to team motives of behaviour, time of controllability of outcome is limited (anterit Awallysis: Documents and media are subject to ex- (hapter &: Research planning > the when and now mis- son as 2 items: 1) designing and stimulating tool 2) efficient design > activity plan & time (hapters of planning) Planning a research project should be understood as follows - an overview of activities to be carried out (planning product)	s & lealings see is distegated sical & social context onsoming, ditting sch
Disadvantages Interview: easier to obtain perspectives, memories and intension com- interview as uness intensiewee an express their thought nisk of strategic answers, natural behaviour interview Offer little or unleviable information regarding phys Observations: not able to team motives of behaviour, time of controllability of outcome is limited (ontent Anellysis: Documents and media are subject to ex- (hapter 8: Research planning > the unen and now mi seen as a items. i) designing and stimulating tool 2) efficient design > activity plan & time (hapter strategic Should be understood as follows - an overview of activities to be carried out (planning process) - including the sequence and timeline (planning product) allebroat notions i) monitoring fonction	s & lealings see is distegated sical & social context onsoming, ditting sch schedule
Disadvantages Interview: easier to obtain perspectives, memores and interview interview asomess interviewer can express their thought nisk of strategic answers, natoral behaviour interview offer little or unreliable information regarding physion Observations: not able to team motives of behaviour, time a controllability of outcome is limited (ankent Anellysis: Documents and media ale subject to ex- (hapter &: Research planning > the when and how mil- sen as 2 items: i) designing and stamolating tool 2) efficient design > activity plan & time (hapter sold planning) an overview of activities to be carried out (planning product) - including the sequence and timeline (planning product) 2) design hunction > Feasible harmonious	s Electings see is distegarded sical & social context onsoming, ditting sch schedule
Disadvantages Interview: easier to obtain perspectives, memores and intension com- interview asomess interviewee can express their thought nisk of strategic answers, natural behaviour interview offer little or unlevable information regarding physion Observations: not able to team motives of behaviour, time of controllability of outcome is limited (ankent Aireitysis: Documents and media are subject to ex- (hapter 8: Research planning > the unen and how mil- son as a items i) designing and stimulating tool 2) efficient design > activity plan & time (nonchemstics of planning) - including the sequence and timeline (planning product) - including the sequence and timeline (planning product) 2) design function > feasible harmonicus - including the sequence and timeline (planning product) 2) design function > feasible harmonicus - when and in which	s Electings see is distegarded sical & social context onsoming, ditting sch schedule
Disadvantages Interview: easier to obtain perspectives, memores and intension com- interview as uness intensiewee can express their thought nisk of strategic answers, natural behaviour interview Offer little or unreliable information regarding physic Observations: not able to team motives of behaviour, time of controllability of outcome is limited (ontent Awallysis: Documents and media are subject to en- (hapter &: Research planning > the unen and how mi- seen as a items. I) designing and stimulating tool 2) efficient design > activity plan & time (noractenstics of planning) an overview of activities to be carried out (planning product) - including the sequence and timeline (planning product) 2) design hinction > feasible harmonious	s Electings see is distegarded sical & social context onsoming, ditting sch schedule

1) Research Trajectory 2) Writing Process 2 parrallel processes at the start UResearch process' body of achivnes concerning gathering, processing and analysing research 2) Whiting process: study of tesearch material and finding of anwers to the research questions from this material Conceptual Writing - must preadle communicative writing - about developing clear thoughts - combine thoughts into a line of reasoning designing a research plan (research tradjectory) lunting process, > research perspective research preperation < gathering of research material te reporting and initial cinalysis feed back >working material gathening of additional material araft version final report, research report Table of contents Chapter 1. Introduction Chapter 21 elaboration theones used, answer to 1st central Q Chapter 3. Methodological justification Chapter 4: Results Chapter 5: Conclusion & Recommendations Time schedule A way to represent a time schedule is with a time axis advantage at a glance we see what achilles & products must be completed at vanous stages disadvaniage: acesnit show-parallel planning TO SHOW Parallel planning, use a instrugram!

yslems Thinking		
Usleme This		
Indiakim		
		the second se
	eful correc	thre to the reductionism
Supray DO ACALL & SLAVENS		A CONTRACTOR OF A CONTRACTOR A
Sultable for getting grips with real-	would pic	blems
ADIZINA MUNKINA		
problem context are punst and	provide 1	recommendations for analysis
and intervention on that bas	SIS	a pasity depticable acted
The notion that it was possible to	o assome	e casily raenineroe, agira
On goals is abandoned. Notion that could not be used to	ornuido	an objective account of the
system and its purposes	s provide	an optime second
lard systems Thinking?		
Participants defined as being in	a unitan	y relationship have simular
values, beliefs and interests. They s	share comp	non purposes
Problem contexts are not extreme		
System Approaches		
Parhcipants	Durich	
Unitary Understanding	Plonst	CEPRIVE
ystem Simple Hard systemsthinking	Approc	post modern systems thinking
Complex System Dynamics, organizational ybernetic	5 80	pose medern squerns minering
complexity theory	58	and the second sec
contributing many	33	
formulating & Research methodolo	que	and the second second
initiation Formulating the	problem	Formulation
- values & rokaz robiechves	Bas	names & constraints 7
Z Identifying designing	ng, and su	reening the alternatives " Research
Alternatives-	a <u>Alan Mar</u>	Forecasting
Building and using models for	realizing	consequences < Force contex
	binative	analization a
is communicating results 7	MININCS.	evaluation &
Evaluating the	analysis	presentation
		ementation z
	VII a UNIVI	
Deusi	Evalua	aling the outcome