A Multi-Methodology System as IT Project Management Approach in South African Banking

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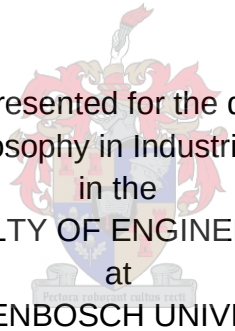

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DECLARATION

By submitting this thesis electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the sole author thereof (save to the extent explicitly otherwise stated), that reproduction and publication thereof by Stellenbosch University will not infringe any third-party rights and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

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ABSTRACT

"Only simple problems have simple solutions."

Russel Ackhoff

South Africa's major banks – Absa, Capitec Bank, FNB, Nedbank, and Standard Bank – have implemented significant changes to their information technology project management approaches and methodologies over the past decade, and will likely continue to do so. Whereas these changes require significant investment and change-absorption, the benefits do not materialize as expected. Furthermore, a growing project management approach and methodology dogmatism is prevalent among practitioners and stakeholders of information technology projects in South African banking.

In response to this situation, the possibilities and needs for the development of information technology project management approaches and methodologies were investigated. Following the investigation, a Multi-Methodology System as an approach to information technology project management in South African banking was proposed as the possible and needed developmental direction; and the design requirements for the Multi-Methodology System were developed and validated.

The Multi-Methodology System was designed to adhere to systems thinking principles relating to Ashby's Law of Requisite Variety and incorporating the controllable adaptability presented by Stafford Beer's Viable System Model.

The Multi-Methodology System presents a useful addition to the study and practice of information technology project management in South African banking as it relates to the interpretation of the large, complex project; and with regards to the selection, tailoring, and hybridization of IT project management approaches. Furthermore, various opportunities for future research were identified.

The Multi-Methodology System was presented to an expert sample of information technology project management practitioners and stakeholders in South African banking for validation. The result validates the design requirements for the Multi-Methodology System and justifies the further development of the Multi-Methodology System for implementation in practice.

A further contribution of this study is the Hegel Circle research approach that was developed for the execution of this study. This research approach draws upon elements of the Scientific Method, Soft Systems Methodology, Design Thinking, and theories of truths, facts, and values. A seven-step research approach was hybridised from these elements and followed during the execution of this research study. The Hegel Circle research approach is replicable, presents a unique contribution, and represents an opportunity for further research and development.

OPSOMMING

"Kreatiewe evolusie sintetiseer 'n nuwe entiteit vanuit die onderdele. Die nuwe entiteit is nie slegs anders as die onderdele nie, maar gaan dit eerder heeltemal te bowe."

Jan Smuts

Suid-Afrika se grotes in die bankwese – Absa, Capitec Bank, ENB, en Standard Bank – het oor die afgelope dekade verrykende veranderinge tot hul informasie tegnologie projekbestuurbenaderinge en –metodologieë aangebring, en sal heelmoontlik weer so maak. Hierdie veranderinge vereis aansienlike belegging en veranderingsaanvaarding en –opneming. Tog, wanneer verwagte en ervaarde resultate vergelyk word, blyk die kool nie heeltemal die sous werd te wees nie. As 'n toevoeging tot hierdie situasie: 'n al groter benadering- en metodologiedogmatisme kan onder informasie tegnologie praktisyns en –belanghebbers bespeur word.

In reaksie tot hierdie situasie was die behoeftes en moontlikhede vir die ontwikkeling informasie tegnologie projekbestuurbenaderinge en –metodologieë ondersoek. Dit het gelei tot die voorstelling van 'n Multi-Metodologie Sisteem as 'n benadering tot informasie tegnologie projekbestuur in die Suid-Afrikaanse bankwese as die nodige en moontlike navorsingskoers; en die ontwerpsbehoeftes vir die Multi-Metodologie Sisteem was toe ontwikkel en gevalideer.

Die Multi-Metodologie Sisteem was ontwerp om te hou by sisteemdenke beginsels, met spesifieke verwysing na Ashby se Wet van Vereiste Verskeidenheid en die bywerking van die beheerbare aanpasbaarheid wat gebied word deur Stafford Beer se Lewensvatbare Sisteem Model.

Die Multi-Metodologie Sisteem bied bruikbare toevoeginge tot die bestudering en beoefening van informasie tegnologie projekbestuur in die Suid-Afrikaanse bankwese deurdat dit 'n verrykte interpretasie van die groot, komplekse projek voorstel; en met betrekking tot die seleksie, aanpassing, en kruisteling van informasie tegnologie projekbestuurbenaderinge. Verder, menigte geleenthede vir verdere navorsing was geïdentifiseer.

Die Multi-Metodologie Sisteem was voorgelê aan uitgesonderde praktisyns en ander belanghebbers van informasie tegnologie projekte in die Suid-Afrikaanse bankwese en is sodoende gevalideer. Die resultaat het die ontwerpsvereistes vir die Multi-Metodologie Sisteem bekragtig; en dui daarop dat die verdere ontwikkeling van die Multi-Metodologie Sisteem vir implementering in die praktyk geregverdigd is.

'n Verdere bydra van hierdie studie is die Hegel Sirkel navorsingsbenadering wat ontwikkel was vir die uitvoering van hierdie studie. Die Hegel Sirkel leen elemente vanuit die Wetenskaplike Metode, die Sagte Sisteem Metodologie, Ontwerpsdenke, en teorieë van waarhede, feite, en waardes. 'n Sewe-stap navorsingsbenadering is verbaster vanuit hierdie benaderinge en teorieë, en was gevolg in die uitvoering van hierdie navorsingstudie. Die Hegel Sirkel is herhaalbaar, en verteenwoordig 'n unieke bydra en geleentheid vir verdere navorsing en ontwikkeling.

ACKNOWLEDGEMENTS

Prof Corne Schutte – I shall ever be grateful to you for granting me the opportunity to do this study under your supervision.

Dr Eric Lutters – you gave the most valuable criticism; and the biggest changes from the initial ideas to the eventual propositions resulted from your feedback. It often seemed that you understood what I was trying to do better than I did. I shall never forget the impromptu hour-long video call on the Saturday night before the submission – that is one of the best memories of the entire journey.

Prof Mellet Moll – in die harde stilte het ons almal ‘n lig nodig om ons te begelei en ‘n staf om op te steun. Ek sal met toonsettinge en Spoegwolf roadtrips vergoed as ek kan, en met ‘n bos lafentel voor die bed as dit moet.

Prof Johannes Cronje – for invaluable practical research and documenting advice, and for showcasing research as a fun team sport.

Johan Zietsman – thank you for the hours and hours of idea-sharing and sound boarding. I trust that your PhD will soon also be successfully completed.

Craig Butcher – over and above the valuable idea-sharing and sound boarding, your zest in the face of the starkest reality motivated me to complete this work. MYSRIP.

Theunis Botha, Nick Louw, Frans Odendaal, John Shepherd, JW Uys – thank you for continual feedback throughout the process of making sense of observations, the development of the propositions, and the eventual validation of the propositions. Although not mentioning them by name, I would like to acknowledge the sample of practitioners who offered their valuable time, effort, and feedback during the validation of the propositions.

Dr Amaris Dalton & Mr. Marius Swart – the greatest joys resulting from this journey are the friendships that we founded. Thank you for your support, feedback, and criticisms.

My family – this study came at a great cost to you and to our relationships. I am not convinced that I should ever be able to repay the great debts that I owe you. At this moment it does not seem as if we shall be able to look back eventually and conclude that it was all worth it. But even though our good humor often failed us, we were together for all of it.

My friends – inevitably I’ll regret not listing all who deserves mentioning. Deon de Jager, you are my oldest friend and were always there to offer support; Eckard Potgieter and Janine van Zyl, all my love to you two; Retief Swart, Matthew McDevitt, Itumeleng Makgetla, Marco Botha, Ferdi Liebenberg, Jaco Muller; Joshua Louw & Stefan Steyn for the music and mysticism that restored the balance in the midst of all the science and rationality.

Andre Latsky – a word of encouragement at the required time can be, and was, invaluable.

Karina Smith & Melinda Rust – you are not acknowledged often enough, but you make the department work, and you make it a good place to be.

DEDICATION

Whereas one can spend hours contemplating the acknowledgements, fearing that a deserved person had not been mentioned, the dedication poses a deeper challenge.

Most advanced and research degrees are completed purely for self-serving reasons. The dedication of a self-serving work to God, or the profession, or country, or to any person(s) other than the self invariably comes across as a fallacious signaling of selflessness. Therefore, this dedication is to the journey that brought me here in general, but specifically to a person who played a most important role in that journey.

Paul Riekert Joubert, my late, childhood friend, I would like to dedicate this work to you. No one may have been aware of this, perhaps least of all you, Paul, but you had an immeasurable impact on my life, and in a sense, you had caused me to become the man who wants to be a thought leader in his field of expertise.

The Joubert household was one of the first in Swellendam to embrace the internet. In a small, rural town that revolved around farming, rugby, and braai, 1 Bronn Street was the revelation of the possible existence. As primary school kids Paul and I, with the help of his older brother, Dawie, immediately put the internet to its intended use. We searched for recipes to build bombs and rockets and we produced a new weapon every other week. I would bring fertilizer from the farm, and we would work for pocket money to buy other materials and chemicals. Paul realized even then that you should not buy all materials and chemicals at the same store, and that you should purchase small amounts at a time to not rouse suspicion.

Sometimes our devices worked at the first try, and we would break out in a victory dance engulfed by the smoke of our creation, or while you could still feel the radiating heat on your face. At other times our weapons misfired, and we knew all too well how seconds could stretch beyond comprehensibility while you waited for the delayed explosion and pondered approaching and inspecting the device. We got familiar with the smell of burnt hair, but thanks to Paul's strict guidance, never incurred serious injury.

At a stage during the late nineties every open patch of grass in Swellendam had a mini-crater and five or so yellow, brown, and black spots - they were the proof that we were there, and that we were.

Despite our chemical bromance, during my last year at primary school in 1999, I accepted a sport scholarship to attend boarding school. It was an agricultural college, and an excellent sports school. Paul immediately, and with honed intent, informed me that Oakdale Agricultural College's motto was: "We're not smart, but we can carry heavy things around." I have found very good use for this line as a self-deprecating joke ever since.

I would visit Paul once or twice annually during our high school years. We had swapped weapons design & development for music by this time, and he introduced me to the likes of Battery 9, Bacchus Nel, Spinnekop, and Zinkplaat. These bands became the soundtrack to

my high school days and caused me to become a singer-songwriter. Even though we remained friendly, our close friendship, much like our chemical exploits, had come to an end.

Arriving at Stellenbosch University as first year students, I was thrilled to find that Paul and I were studying very similar degrees and shared two majors. I was always glad to see Paul before class and enjoyed his merciless arguments with our lecturers without end. I was always sad once we parted. The exterior differences were obvious, but unimportant. He wore his dark hair long, and always exceptionally clean and neat. The accompanying t-shirt would mostly feature a heavy metal band's insignia. But there was something troubling below the surface that I could never put my finger on. I, too, was in an interesting place. I still carried the residue of the high-school jock in all my being, but I had also progressed to become involved in a cult. Whereas Paul could single-handedly ruin an economics lecture, I righteously did my worst during existentialist philosophy lectures. I guess Paul was the perfect mirror – that's probably what saddened me during those days.

In 2010 I started working in the banking sector in Johannesburg. Making more money than I could figure out how to spend, I finally followed through on a long-time dream and recorded my first full length album of original songs. One of the content producers for Afrikaans radio, Maroela Media, had their studios at the Centurion headquarters of a trade union called Solidarity. I had heard via the grapevine that Paul, along with another friend from my Stellenbosch days, Piet le Roux, were Solidarity's economists. After visiting Maroela Media's studios the first time, I took a chance and enquired from the reception lady regarding Paul and Piet. As luck would have it, their offices were about twenty paces to the south of Maroela Media's studios, within the same building.

It became a delightful little tradition. Once or twice per year, when releasing a new album or single and music video, I would visit Maroela Media and subsequently hang out with Paul and Piet. Before the last visit, I read a piece by them outlining the likely detrimental impacts of the government's (interventionist) policies of the time. I was looking forward to discussing their research and findings after my imminent visit to Maroela Media's studios. We had strong differences of opinion and a mild argument relating to the empirical characteristics of their research and the interpretation and application of the Austrian-school theories in economic research.

I am not sure what followed first - my relocation to Cape Town, or Paul's move, along with his wife, to the USA. All that I can remember is, it felt like the next moment when I was informed that he had cancer, an aggressive cancer, and that he would not survive. I did not think of Paul that often during his illness. I was not sure that my thoughts or prayers would be of any help, and besides, I had my own challenges. Most of all, I think that I did not want to accept how fate can seemingly change its own direction. I was so sure that Paul and I would become close again as adults. I was looking forward to learning from him again, and I was gathering one or two things that I could perhaps reveal to him. Most of all, I was looking forward to arguments, to fighting verbally – it is so rare to find a person with whom you can have enjoyable battles.

I never had the opportunity to discuss this thesis with Paul, but boy, how often did I catch myself preparing to explain the propositions to him and to defend it thereafter from his most vicious logical challenges. If my defence of the thesis is successful, I'll cast a pebble into the ocean. Or, rather, I'll launch a biodegradable home-made improvised explosive device over the Atlantic.

Well, old friend, the once destroyed grass patches and mini craters that we left in Swellendam's fields are not discernible anymore, and the memories will follow suit. But at least there is one thing that I can do: I can dedicate this text to the facts of our youth, and to the name of the man who made me want to know more, to your name, Paul Riekert Joubert.

…

There is a little bit of space left on the page. This is ultimately my work and may be the only document of this kind that I'll produce – so, I shall add the following:

Zelda Monique de Wet (nee Meyer) and I got together when I started out in the banking industry, began recording my first solo album, and was studying towards a Master of Science in finance. Eleven years later, she still has a man who is pursuing dual careers and studying. And this man is also the father of her child. I used to say, 'thank you'. Then I'd say 'sorry'. Later I said, 'forgive me'. And now I say: please forget.

Back, before it became clear that this studying and research business would become the labyrinth that it did, she used to bring me coffee when I was working late. I'd be especially grateful if the coffee was not hot – then you could gulp it down faster and benefit sooner from the effect of the caffeine.

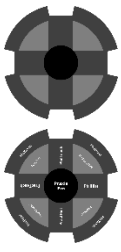
It was the most precious experience. A little refrain came to me in 2012:

Pour me my coffee lukewarm
and I wouldn't get all religious on you
if you'd pour me my coffee lukewarm
I'd sell you my birthright tonight

It has since become a song after developing through many versions and taking many forms. I intend to release it in March of 2022 to say, 'thanks' and 'sorry'; and 'forgive' and 'forget'.

…

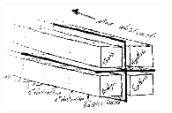
The reader will see a couple of diagrams in the document that are not referred to in the text. These diagrams, similar to the quotes used at the start of chapters and some sections, tell a story that mirrors the greater narrative.



The first diagram follows the dedication of the work to Paul Joubert. The aesthetics of the image is inspired by Paul's love of heavy metal, and near the end of the document the meaning is revealed. Where sectors of the 'shield' overlap, the image is darker, and the journey of the researcher is to become the praxis pro that constitutes a practitioner, teacher, historian, and philosopher of the field. In practice driven fields like project management and some types of engineering, it

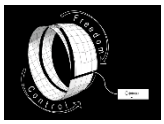
is difficult to believe that one can be a useful researcher or lecturer of the field without being an active practitioner, and *vice versa*.

At the end of the preface, the old pagan symbol for viability is adapted and displayed. The preface introduced viability and systems thinking as theoretical points of departure for the propositions of the study. Symbols for variety, control, and adaptability are added in the arms of the viability symbol, indicating the prerequisites for viability. Viability is further represented by the sprout in the center.



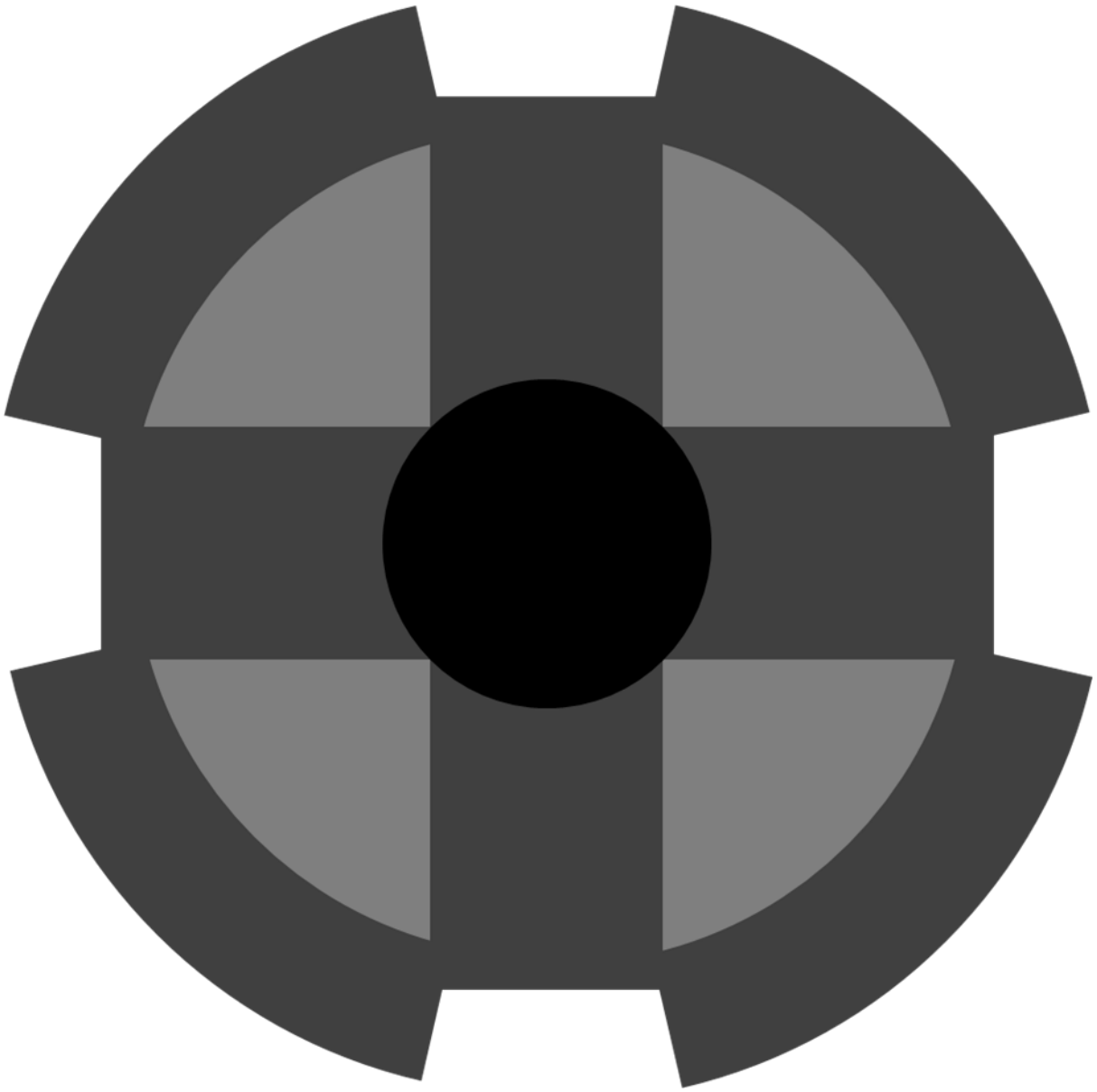
Part One of the document culminates in the establishment of the Hegel Circle as research approach for the study. The sketch at the start of Part One is an early visualization of the Hegel circle and how iterations would build on each other.

Part Two culminates in the design of the Multi-Methodology System, taking People, Process, and Technology considerations into mind at various stages. The diagram contains symbols for people, process, and technology.



In trying to design an ideal methodology system while trying to leave enough room for self-organization, it was thought that we are always trying to find a balance between extremes as consultants, researchers, and teachers.

Eventually, the goal remains to create an organization that is viable, or a project that is temporarily viable (represented by the sprout in the center once more) which requires optimized processes (bottom right), good organizational culture (bottom left), and the requisite skills and talent among the human resources (center top).



PREFACE

"All happy families are alike, each unhappy family is unhappy in its own way." This is Tolstoy's famous opening line in the novel, Anna Karenina. It has seemed[1] to me that all successful organizations are alike, and that all successful temporary organizations – projects – are alike too. And, that all unsuccessful ones can be unique failures. I have spent most of the last decade of my career as a consultant tasked with improving banks' approaches to information technology project management. While there were some accomplishments, the disappointments stick out in the mind.

In Part Eight of the novel, the narrator of Anna Karenina recounts about one of the main characters, Konstantin Dmitrievich Levin, that "whenever he had tried to do something that would be of benefit to everybody… he had noticed that while thinking about it was pleasant, the activity itself was always ineffective, … [that] which seemed so significant, would shrink until it was reduced to nothing." An unpleasant familiarity[2] may be sensed by the honest business consultant.

The narrator remarks a little further on that Levin "was happy when he wasn't thinking about the meaning of life" and "that he had been living well, but thinking badly." Levin concludes that "not just intellectual pride, but intellectual idiocy" and "above all… intellectual trickery… and dishonesty" were the causes of his troubles. I recall that the best projects that I had been part of were examples of crisis management rather than project management. During crisis management one does not run the risk of thinking badly or displaying intellectual pride – there is simply not time for that, and all actions are demanded by the situation.

It is when we have the luxury to painstakingly contemplate ideal solutions[3] that our good intentions, coupled with our dearly acquired hours and intellects, give birth to the shiny Trojan mare. We may call her 'solution', we may call her 'best practice', and we are always oblivious to our intellectual pride, idiocy, trickery, and dishonesty neatly hidden in her belly.

Have I, and Tolstoy for that matter, contradicted the notion that all happy families are alike and that all successful organizations are alike? Since, surely, if the likeness axiom of all happy families and all successful organizations were true, then the requirements for happiness and success should be determinable. In this case, consultants should be able to *save the world*. But then, in this *de facto P = NP*[4] scenario, we should already have been, at least, much closer to solving all the problems that have hitherto been persistent.

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[1] Substantiation of this statement can be found in Appendix A – The Generality of PM Principles.

[2] This study followed from observations made in practice (chapter 2.1) and discussed with other practitioners (section 2.2.1).

[3] 'Ideal' vs 'synthetic' positions (or conclusions) are discussed in the text referring to Figure 1.3.1-3.

[4] The P vs NP problem is one of the Clay Mathematics Institute's 'Millennium Problems'. P equalling NP implies that all questions whose answers can be quickly checked should also (eventually) be solvable within a 'reasonable' period.

Alternatively, if familial happiness and organizational success are simply down to dumb luck, then there is no reason whatsoever to do any research study in the first place.

The truth of the matter[5] is that there are happy families and successful organizations. The fact of the matter is that no families or organizations are 'absolutely' happy or successful. The crises that I have managed made for exhilarating projects, but were crises none the less. Knowingly, the last project that I managed had a metric for loss of human life.

Where does this leave us regarding the scope of management research[6] and business consulting? I would propose this: There is no 'best practice', but there are fundamental principles; and, outside of chemistry, there is no solution, but there are better and worse trade-offs.

How often do we hear intellectuals claim that they are arguing for their better principle over another's weaker principle? Like one side arguing for collectivization and claiming that the other side is against it. This happens even though it is impossible for collectivization to not occur between organisms, since there could not have been organisms in the first place without collectivization. In this case intellectuals claim that they are arguing a principle, when all that can be argued at all is the practiced application of the most fundamental of principles: will collectivization be predetermined or self-organizational; at what level could or should it occur; how does the collectivization strategy of group *X* impact group *Y*? In project management proponents of agile often point to the principle of direct product owner involvement as if it is a unique principle. However, in all theories of project management sponsor (or client or product owner) involvement is stressed as cardinal, it is only the practice of the principle that differs by choice or circumstance. The same can be said for ideals like co-location or dedicated resources – the question is not whether it is desirable, but to which extent it is feasible[7].

The problem for business consulting is that, unlike a 'best practice', it is difficult to copyright and sell or license a principle. How do you develop management information software for a principle? The problem for management research is that it is hard to justify a trade-off as a novel and significant addition to the body of knowledge. Tolstoy would probably have quoted[8] Matthew 7:14 – "How narrow is the gate, and restricted is the way… Few are those who find it." But, I would counter with the hopeful lyric from an upbeat Shane & Shane song: "May the few be many… may the narrow road be wide."

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[5] The fact-value 'distinction' is discussed in the text relating to Figure 1.3.1-1 and theories of truth in text relating to Figure 1.3.1-7.

[6] Appendix D (page 241) outlines the development of project and project management research to the present and specifically outlines some of the issues prevalent in management research.

[7] This paragraph relates most strongly to the Systems Thinking critique of project management approaches in section 2.3.5.

[8] This speculated quote does not aim to introduce theology or some perennial wisdom, it simply seeks to remain true to the analogy as it concerns the novel and its author.

It seems self-evident that no set of agreed and accepted fundamental principles can assure familial happiness or organizational success. It is the adequate translation of the principles into practices, and then the adoption and execution of the practices, subject to all factors not in our control (for which 'luck' could be used as a catch-all term), that can lead to happiness or success. But, also, the lack of the principle most certainly guarantees unhappiness or failure. As the old project management adage goes: failing to plan is planning to fail[9].

I am not convinced that the translation of the principle into the practice can ever be an exact science[10]. I think that it will always be subject to dynamically variable contextual impacts. At the grand scale, this is the reason why I think $P \neq NP$, because no amount of computing power can control for all factors – by the time a complex question had been answered, the question may have changed. New capabilities give rise to new questioning, but the translation of the question into instructions is always an approximation and, furthermore, subject to error. The development of adequate instructions may not be executable in *polynomial* time, never mind the computational execution of the instructions! And thus, the evolutionary gap between *P* and *NP* is not only maintained, but likely widens with time. The same counts in our humble world of information technology project management – whereas we may see a current improvement in project success with the introduction of some ideally hybridized project management approach, the next projects will produce novel project management challenges. The aim must therefore be to have an arsenal of methodological capabilities at hand, and an approach that is adaptable when change is required.

I chose to apply the principle of 'Viability' as described in Stafford Beer's Viable System Model for the development of a Multi-Methodology System as an approach to information technology project management in South African banking[11].

Apart from the success of the Viable System Model as a theory of organization, the Viable System Model also has a romantic draw. The Viable System Model was derived from viable biological systems and found to be applicable to human organizations. Furthermore, although likely influenced by my friendly bias, links to Eugene Marais' '*The Soul of the White Ant'* and Jan Smuts' '*Holism and Evolution'* can also be identified.

In the spirit of Marais' assertion that the ant colony should be seen as a single super-organism, I would extrapolate that a human organization is a single super-organism and should be treated as such.

Smuts proceeded from Darwin's natural selection theory to state that variation had to exist first for selection to be possible at all. Smuts further opined that those variations appear in complexes, and not singly, and that evolution was therefore not merely the outcome of individual selections, but holistic. Following from this argument the Multi-Methodology

[9] This paragraph most closely relates to section 2.2.2.1.

[10] The prevalent dogmatism that champions the opposite view is discussed in section 2.2.2.2.

[11] This is the main work and contribution of the study and follows in chapter 2.5.

System imitates what is perceived as natural by positing complexes of variation from which the methodological approach to project management can be selected.

Viability is the principle. I seek to apply it in the setting of information technology project management in South African banking. I hope that useful and valuable practices may have been produced by this study for the stated setting; that it may be adopted in the stated setting; and that general learnings concerning the synthesizing of fundamental principles into relevant practices may have been produced[12].

Typical of a realist Russian novel, Anna Karenina consists generally of the most deftly described everyday tragedies, the vibe being as grey as a dull headache[13] for the greater part. And this naturally causes the hopeful moments to be experienced as pleasingly colorful – almost like flowers by Manet[14] or Renoir. Levin finds his peace toward the end of the story, and remarks: “And don’t all philosophical theories do the same, by means of the kind of thought which is strange and unnatural to man, leading him to knowledge of what he has known for a long time, and knows so well to be true that he cannot live without it?” Which ideas, that I have always known to be true, have I come to knowledge of through experience and this strange and unnatural research process? I would count among these that the business consultant and management researcher should not start off by imagining improvements, but should apply historicism in principle by first seeking to truly understand the situation as it is, and then to formalize it as it is. Thereafter, perhaps, improvements may be proposed.

The application of the Viable System Model to information technology project management in South African banking is an attempt to describe the temporary organization as it naturally is. The Multi-Methodology System seeks to formalize information technology project delivery as it already occurs. If this interpretation and formalization of the situation is accurate, project delivery may be enhanced by the application of the Multi-Methodology System.

Along with looking forward to managing projects with greater success, I hope to live well and think better after the submission of this text.

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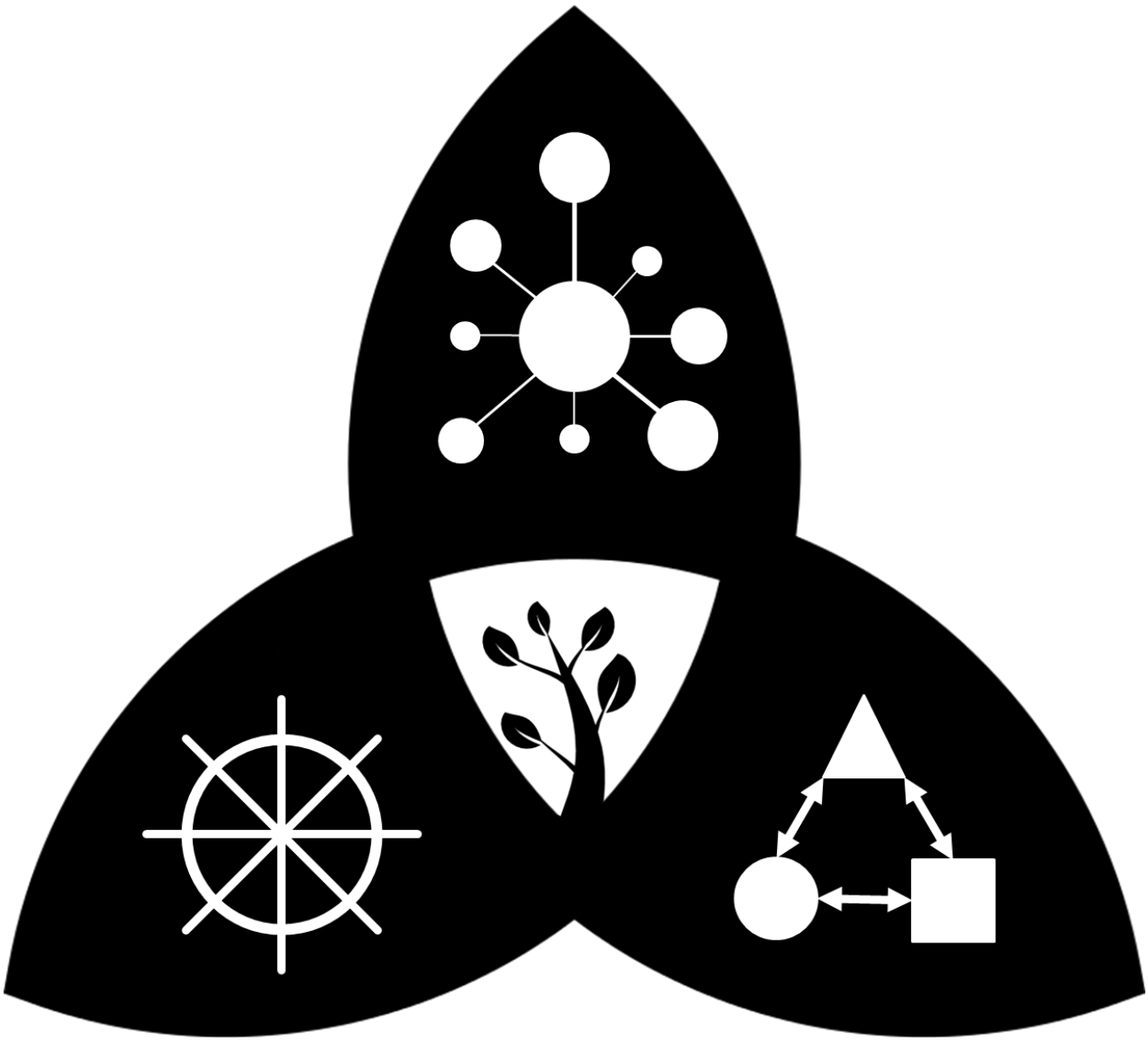
[12] The value and constraints of the study is elaborated on in chapter 1.4 and section 2.7.2.

[13] *Grey as a dull headache* (grys soos ‘n dowwe hoofpyn) was taken from a Nathaniël story.

[14] Readers with knowledge of the French Impressionistic movement of the 19th century may expect Claude Monet to rather be mentioned alongside Pierre-August Renoir. The reference is to Edouard Manet, the modernist painter, though, specifically for his use of dull colors for backgrounds and less vivid colors for flowers (as compared to Monet). I find this comparable to Renoir’s Spring Bouquet for the flowers being pleasing and happy, despite the colors seeming to be less vivid than in real life. I think that the dull background plays a part in this, just like the moderately happy moments in Anna Karenina perhaps seeming more pleasing because of the harshness of the rest of the story.



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FIGURES

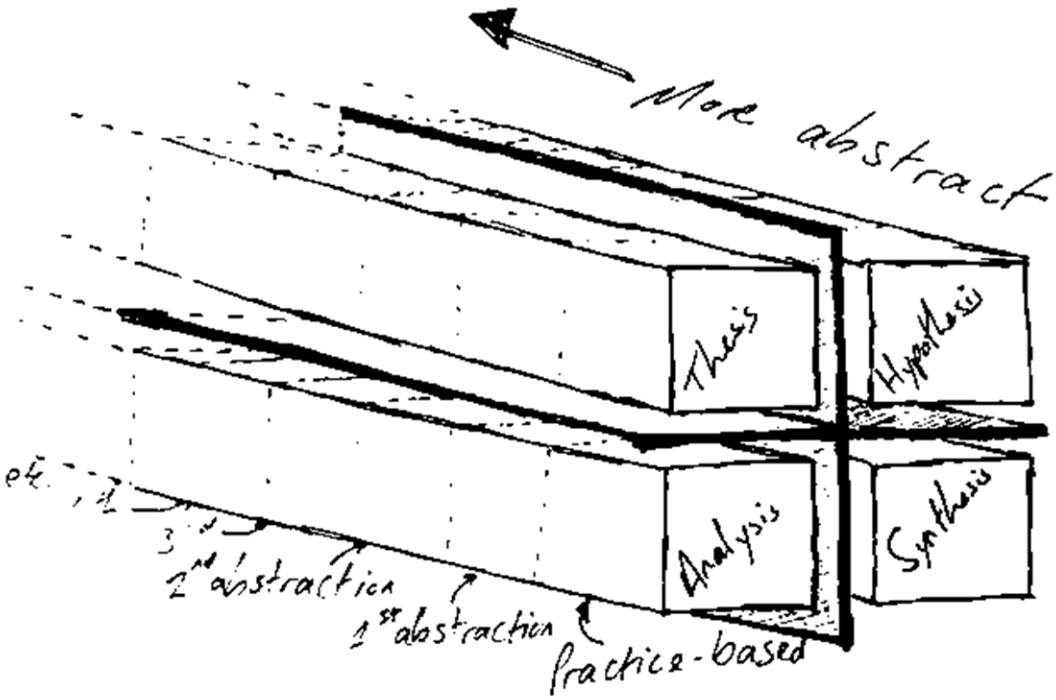
TABLES

EQUATIONS

NOMENCLATURE

Abbreviations, Acronyms, and Portmanteaus (in order of appearance).

#	Explanation	p.
1. IT	Information Technology	3
2. SA	South African or South Africa	3
3. EFT	Electronic Funds Transfer	3
4. ZAR	South African Rand	3
5. US$	United States Dollar	3
6. ATM	Automatic Teller Machine	4
7. COBOL	Common Business-Orientated Language	5
8. SQL	Structured Query Language	5
9. PM	Project Management	6
10. Prince	‘Projects’, ‘in’, ‘controlled’, and ‘environments’	12
11. SAFe	Scaled Agile Framework	14
12. DevOps	‘Development’ and ‘operations’	14
13. BOK	Body of Knowledge	15
14. PMBOK	Project Management Body of Knowledge	15
15. PMI	Project Management Institute	15
16. POSIWID	The Purpose of the System Is What It Does	15
17. ISO	The International Organization for Standardization	44
18. IBM	International Business Machines Corporation	44
19. VSM	Viable System Model	43
20. XP	Extreme Programming	70
21. SAIIE	South African Institute for Industrial Engineering	75
22. IEOM	Industrial Engineering and Operations Management (Society)	75
23. ITIL	Information Technology Infrastructure Library	77
24. ABAP	Advanced Business Application Programming	80
25. MMS	Multi-Methodology System	104
26. VTSM	Viable Temporary System Model	104
27. DSDM	Dynamic Systems Development Method Agile Project Framework	107
28. PM	Project Management	123
29. PMM	Project Management Methodology and Approach	123
30. MCT	Methodology Comparison Tool	123
31. SAP	Systeme, Anwendungen und Produkte in der Datenverarbeitung	172
32. SARB	South African Reserve Bank	234
33. POPIA	Protection of Personal Information Act	234
34. GDPR	General Data Protection Regulation	234
35. CBS	Core Banking System	236
36. SaaS	Software as a Service	236
37. ICT	Information and Communication Technology	241
38. BPR	Business Process Reengineering	241
39. ITPM	Information Technology Project Management	243
40. ITPMM	IT Project Management Methodology	243
41. CCMs	Complex Causal Models	254



1 Part One – Foundational Work

"'Do you want a frozen banana?'

'No, but I want a regular one later, so, yes.'"

Mitch Hedberg

Part 1
Foundational Work

Part 2
Execution

Introduction

Definitions & Clarifications

Research Approach

Value & Constraints of the Study

Perusal Instructions

"I have, using language, decided to draw footprints for my feet to walk in.
I decided to write a book. But writing is cheating."

*From **Breyten Breytenbach**'s*
'Gebruiksaanwysings vir 'n Skryfdaad' (Instructions for the Perusal of an Act of Writing),
the introduction to 'Soos die So'.

Reading a thesis is a significant undertaking at the best of times. Whereas I would not imply that you are now met by the worst of times, it would be helpful to frame the period that you allocate to your first viewing of this work as an 'epoch of belief'. You are about to enter a realm of thoughts and reasoning that require an amalgamation of content and process of formulating. The reason for this is that the content will evolve by means of circular, iterative, and even recursive, reasoning at varying levels of abstraction. Hence, terminology is used from the beginning, which is the outcome of ongoing iterations, and may not be obvious from the start.

The circular approach is a unique contribution of this thesis, as it introduces an alternative way of conducting this type of research project. The circularity implies that there is neither a beginning nor end to the reasoning once this circular research approach is entered.

Beforehand, however, it is good to know that you are entering the circle where the design requirements for the propositions of the study have been validated by a sample of expert practitioners, and the research process up to this point has been reported on in this document.

At the end of this thesis, the circle will be left at the point where it was considered that enough material could be presented in support of the claim that the objectives of the research study had been met. That does not mean that the research is finished – in the proposed circle, the research can and will continue. But here it is argued that the joint constraint of required outputs and reasonable inputs had been reached.

The document consists of two main parts: Part One – Foundational Work and Part 2 – The Execution of the Research Study.

This first part of the document consists of four chapters, as illustrated by the visual aid below the heading. The 'foundational work' alluded to in the title of this first part is conveyed in four chapters.

The first chapter (1.1) introduces the background of the research study reported on in this document and the second chapter (1.2) offers some definitions & clarifications..

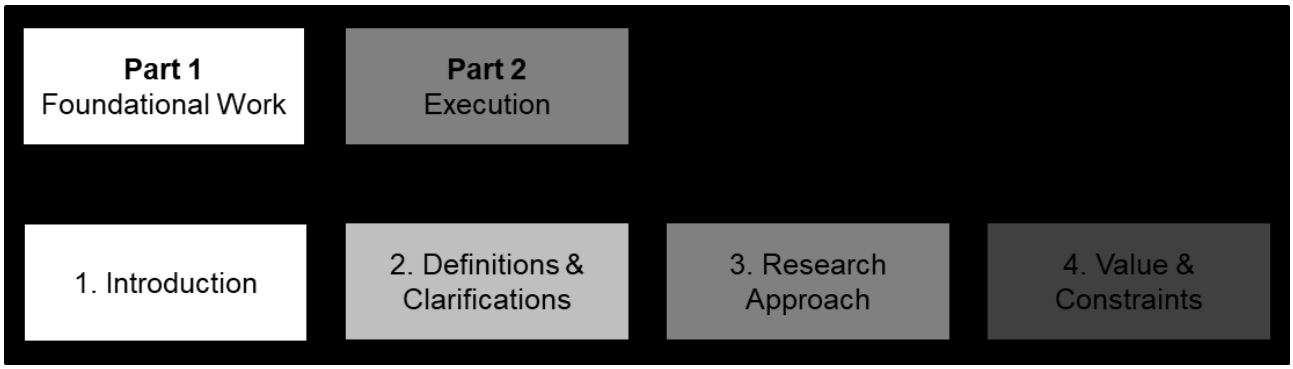
The application of the research approach to the execution of this research study is described in chapter three (1.3) and chapter four (1.4) covers the value and constraints of the study.

Part Two describes the execution of the research study through seven chapters.

1.1 Introduction

"It is terribly important to appreciate that some things remain obscure to the bitter end."

Stafford Beer



The major South African banks – Absa, Capitec, FNB, Nedbank, and Standard Bank[15] – have all implemented significant changes to their information technology project management approaches since 2010, or are in the process of doing so. Whereas these changes come at substantial cost, effort, and impact, it is not clear that the expected benefits materialize.

This state of affairs prompted the question: What are the needs and possibilities for the development of information technology project management approaches and methodologies in South African banking? In response to this question a Multi-Methodology System is proposed as the needed and possible evolution of project management approaches and methodologies in this setting.

The Multi-Methodology System endeavours to advance the fundamental understanding, theory, and principles of information technology project management approaches, and the methodological application thereof to practices. The proposed marginal value is attributed to the incorporation of Systems Thinking principles – chiefly relating to Ashby's Law of Requisite Variety (Ashby, 1956, 1991, 2011; Beer, 2002) and Stafford Beer's Viable System Model (Beer, 1984; Jackson, 1988; Parker and Britton, 1993) – into the development of the design requirements of the Multi-Methodology System.

What is the proposed utility of the Multi-Methodology System? The Multi-Methodology System enables the creation and application of enhanced methodological approaches to information technology project management in South African banking. It is expected that improved methodological approaches are necessary for improved information technology project delivery.

[15] These are the commonly used names for Absa Bank Ltd, Capitec Bank Holdings Ltd, FirstRand Ltd, Nedbank Group Ltd, and the Standard Bank Group.

The design requirements for the Multi-Methodology System were validated by expert practitioners and other stakeholders of information technology projects in South African banking as expected to be both implementable and valuable in this practice.

It is argued throughout the narrative description of the study reported on in this document that whereas the formalization brought about by the Multi-Methodology System is novel and of value, the underlying aspects being formalised are the reality which occurs naturally. There is no claim to the invention of an altered state, but rather of innovation as to the interpretation of the status quo. This innovation is said to enable the formalisation of that which is already the case. And then it is argued that this formalisation enables measurement, monitoring and controlling, and improvement.

A couple of short subsections follow which introduce the setting, summarise the problem statement, research approach, propositions, validation and findings, and the document structure. The intention is to confer the major aims and outcomes of the study reported on herewith as simply as possible and wishing to ensure that the document is sufferable to the reader.

1.1.1 Information Technology Projects in South African Banking

Information technology (IT) projects in South African (SA) banking[16] can be as small as changing a business rule and communicating the change. An example of this could be changing the transaction fee charged for a local inter-bank electronic funds transfer (EFT) from 25 cents to 20 cents, updating the relevant documentation, and informing client-facing employees and clients. Small changes like these will normally be grouped together and receive approval for a total budget of about ZAR10’000’000 (about US$675’000 or US$1’000’000 using 2020 purchasing power parity) at the start of the financial year. Resource allocations, costs, and durations per change will differ from bank to bank and depend on the types of resources which are expensed to the project or treated as sunk cost. In general, each individual change will cost less than ZAR500’000 (about US$34’000 or US$50’000 using 2020 purchasing power parity), have durations of less than six months, and not require more than five human resources. If a change exceeds these estimates, it would be difficult to justify it being grouped with the other small changes.

At the other end of the scale, a core banking transformation programme or a significant data migration programme have budgets exceeding US$1’000’000’000, may have five-year+ durations, and require hundreds of human resources. The projects of which these programmes consist often have multiple year durations, may require more than a hundred

[16] The explanation given in this section refers to the original four major banks of SA – ABSA, FNB, Nedbank, and Standard Bank. Capitec Bank was founded in 2001 and have caught up with the original four major banks in terms of account holders. The relative newness of Capitec Bank implies a systems landscape free of legacy systems and functionality silos – which implies that the typical Capitec Bank IT project is atypical compared to the four original major banks’ typical IT projects in terms of management approach, costs, durations, and complexities. IT project management at Capitec Bank is discussed in section 2.1.1 and in Appendix B – SA Banking for IT PM Research.

human resources, and may have budgets exceeding ZAR250'000'000 (about US$17'000'000 or US$25'000'000 using 2020 purchasing power parity).

Whereas a billion-dollar programme's 25-million-dollar multi-year project would be expected to qualify as large and complex, the more interesting cases for the purpose of this study lie in the wide middle range. An IT project in SA banking with an estimated budget of less than ZAR10'000'000 (about US$675'000 or US$1'000'000 using 2020 purchasing power parity), an estimated duration of less than a year, and estimated to require fewer than 25 human resources over the total duration of the project can be (or become) a large project in terms of impact, and complex in terms of integration.

An example of a relatively small change having large implication would be an update to the graphics displayed on the screens of an automatic teller machine (ATM). Standard Bank, as example, has 9321 ATMs of various ages and brands (Standard Bank Group Ltd, 2019). The small change may imply thousands of machines requiring improved graphics processing and integration between the transactional and graphic components.

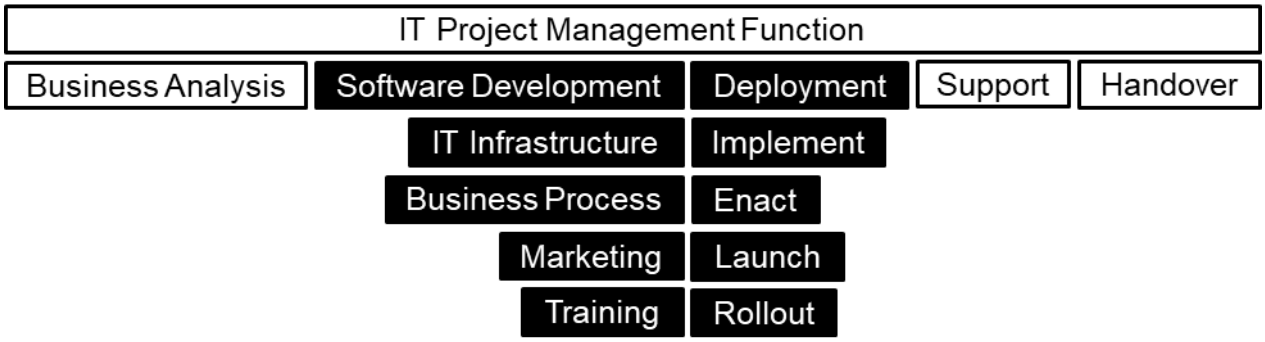


Figure 1.1.1-1: Simple Illustration of a Typical SA Banking Project

Referring to Figure 1.1.1-1, since project management capabilities have been developed over decades in the IT teams in SA banking, non-IT components of initiatives are often delivered under the umbrella of the IT projects' management. Another reason for this integration is quite logical: the requirements for the IT component are elicited from business[17], and operations (often marketing and training too); and the business side respond to the assets and functionalities delivered by the IT component. The integration of disparate types of work, like IT components, marketing, and training add significant complexity to the typical IT project in SA banking.[18]

[17] 'Business' is a common term in SA banking for the internal 'client' or 'sponsor' or 'product owner' for the project.

[18] The addition of components like Training and Marketing may seem to add insignificant complexity. Anecdotally, however, the authoring researcher consulted on the launch of a private clients' suite in 2016 which was delayed by VISA's rejection of the credit card's aesthetic design. It may be argued that the card's design would still have been rejected if the marketing component was not part of the IT project, still causing the launch to be delayed. However, since the marketing component (responsible for the design and approval) was part of the IT project, the IT project manager had to take responsibility for the delay, and the issue ultimately 'became' a failing in an IT project and of the bank's IT project management function.

Lastly, the systems landscape adds significant complexity IT projects. Figure 1.1.1-2 is a high-level illustration. Each of the component groups in Figure 1.1.1-2 are made up of multiple systems, coded in different languages, and have to integrate through multiple interfaces. As the most commonly tangible example: Customer gateways and channels consist of mobile banking apps (likely coded in Objective C or Swift for iOS and Java or Kotlin for Android), web-based internet banking (likely coded in C#, C++, or Java), ATMs (likely coded in Cobol for transaction processing and one of the C-section[19] languages for the graphic interface), and bank branches (branch systems likely represent codes ranging from legacy languages like Cobol and SQL[20], the usual suspects like Java, the C-section, and younger languages like Bootstrap and Swift).

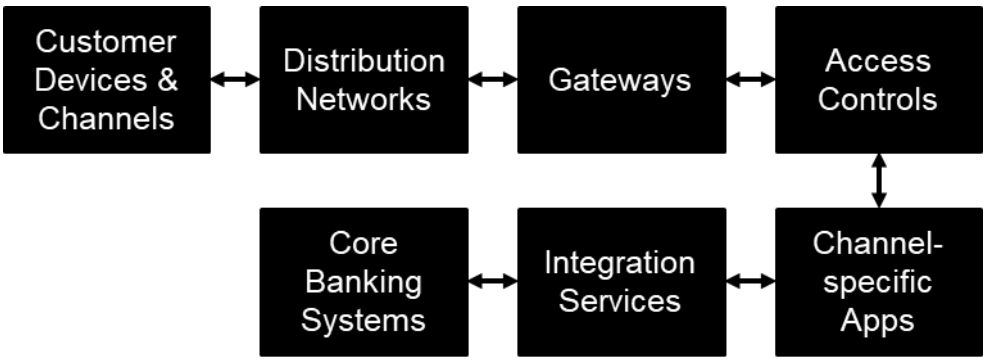


Figure 1.1.1-2: Typical High-Level Component Groups in Banking Systems Architecture

Each of these component groups are likely to be impacted by a small change made to an existing transactional product. Each component communicates through the multiple, unique interfaces of the systems architecture to the core banking systems, and beyond.

For these reasons – small system changes having wide impacts on large physical networks, the variety of the types of work delivered by IT projects, and the complexity of the systems landscape – a seemingly small change can cause a large, complex project.

IT in SA banking is an exciting setting for project management. The combined IT spend of the four original major banks exceed ZAR30’000’000’000 per year (about US$2’000’000’000 or US$3’000’000’000 using 2020 purchasing power parity) (Tarrant, 2016). In response to the demands of IT project management, SA banks have employed a variety of approaches to project management, periodically implemented significant changes to their project management approaches[21] (Johnston and Gill, 2017) (Gardiner, Weber and Curtis, 2008),

[19] The C-Section refers to the popular languages that follows C’s syntax, like C#, and the object-orientated extensions of C, like C++ and Objective-C; and contains ‘C’ in their names.

[20] COBOL is short for Common Business-Orientated Language and SQL is short for Structured Query Language.

[21] At one end of the spectrum, Standard Bank implemented an organization-wide agile transformation (read more about this here), at the other end Nedbank has continuously adapted their approach to IT project management following what they refer to as a ‘managed evolution’ strategy after embarking on a business process maturity journey in 2002. The references are provided in-text and separately, since Mendeley cannot cite from MS Word footnotes.

and continues to do so. IT project management approaches in SA banking are discussed in section 2.3.4 and in Appendix B – SA Banking for IT PM Research[22].

1.1.2 The Problem Statement

The summarized problem statement is:

- Existing approaches to project management does not adequately cater for the intricacies of large, complex information technology projects in SA banking.
- Principles of Systems Thinking, like adaptability, variety, and viability is not catered for by existing approaches to project management.
- No adequate tool, framework, or other resource for the comparison of project management approaches, methodologies, processes, and the like could be identified.

The problem statement resulted from a process including practice-based observations, state of the practice literature review, criticism of the status quo literature review, and proposition-enabling literature review.

Initial observations were investigated and found to present an opportunity for research. It was concluded from analyses of IT project management approach success factors (Khoza and Marnewick, 2020; Gemino, Horner Reich and Serrador, 2021) and trends (Marinho *et al.*, 2019; Komus, 2020) that theoretical contributions were needed to explain the findings. The empirical findings of the cited works, coupled with criticisms of accepted approaches to project management (Whitty, 2005; van der Hoorn and Whitty, 2015a; McGrath and Whitty, 2019; S. McGrath and Whitty, 2020) and the non-adherence to 'best-practice' in practice (Marnewick, 2017) prompted a Systems Thinking criticism (Yeo, 1993a; Kapsali, 2011a; Hidding and Nicholas, 2017). The possibilities of applying the Viable System Model to improve IT project management approaches (Murad and Cavana, 2012; Bathallath, Smedberg and Kjellin, 2016, 2019) and the proposition that unique methodology tailoring and hybridization for the individual project (Špundak, 2014) presented a possibility worth investigating resulted in the derivation of the problem statement.

The process is described in chapters 2.1, 2.2, 2.3. It was hypothesized (chapter 2.4) that responding to the problem statement would make for a worthy research study and add value to the body of knowledge and practice of information technology project management. It was then stated as the research objective that the hypothesis should be tested by developing (chapter 2.5) and validating (chapter 2.6) designing requirements for propositions that respond to the problem statement.

The iterative evolutionary cycle of the problem statement, and the like, is now explained. Three iterations of evolutionary development are illustrated in Figure 1.1.2-1. Referring to

[22] PM is only used for 'project management' in this document, and the use is restricted to headings, tables, and figures as far as possible, because PM can easily be read as referring to the manager or management of projects or programmes or portfolios.

the first column: the commencement of the study follows from observations made in practice. The first problem to be addressed by the research is to scrutinize the problem. The first questions of the research relate to the scrutiny of the observation. The first objective of the research is to answer the research questions.

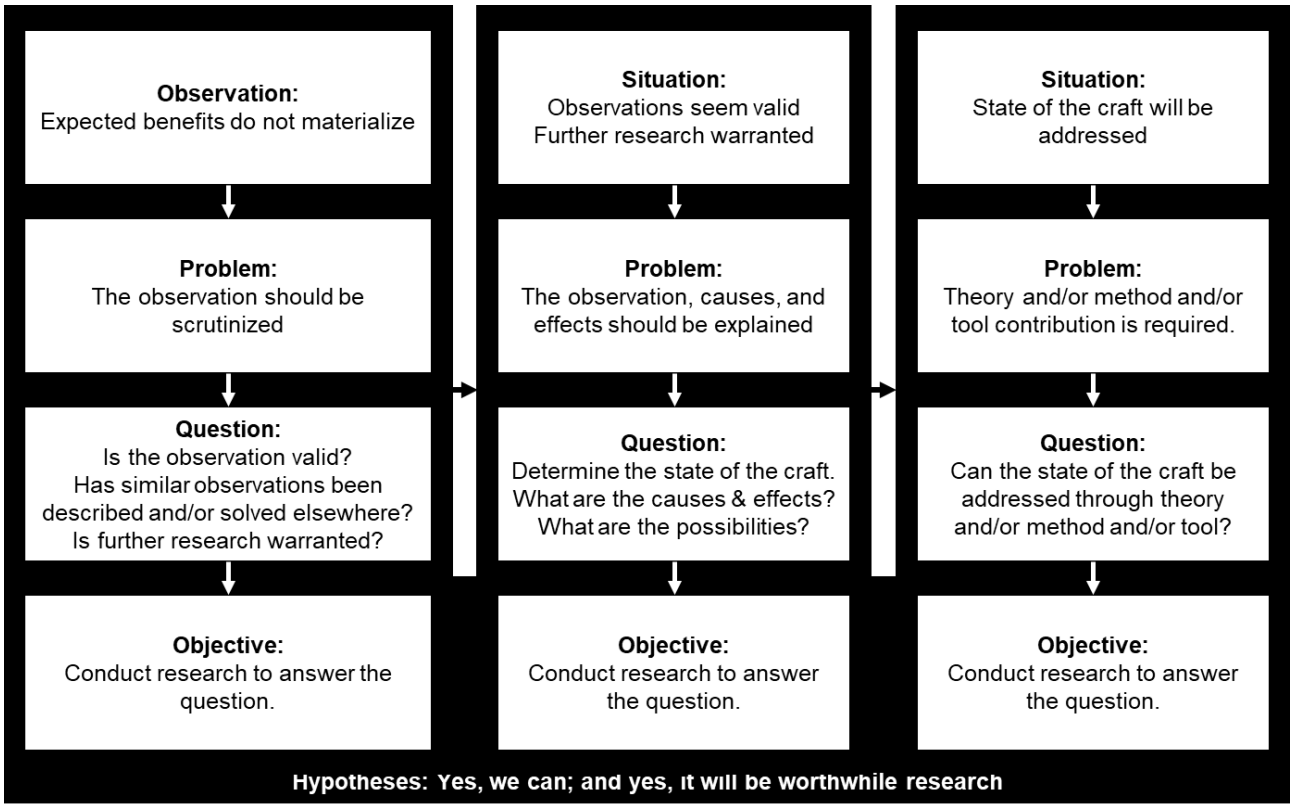


Figure 1.1.2-1: The Iteratively Evolving Research Problems, Questions, and Objectives

Referring to the second column: the outcome of the first iteration presents the starting point for the second iteration. The determination of explanations for the observation, its causes, and effects are now the problem to be addressed through research. The questions of the research are now aimed at the characteristics to be explained and forward looking too in contemplating a desired future state for the craft of IT project management. The objective of the research now relates to addressing these questions.

Referring to the third column: the outcome of the previous iteration sets the scene for the present iteration once more. The problem now concerns the required theory or methods or tools, or a combination thereof, to move the state of the craft in the direction of the envisioned state. The eventual research questions relate to the propositioning of possible enhancements. The research objective is now to address this question.

Referring the very bottom of Figure 1.1.2-1: Whether stated or not, there is, at all times, the implied hypotheses that the research objectives can be reached, and that there is value in executing the objectives of the research. When either hypothesis is rejected, the study must be concluded with the finding: it is not possible to continue this study under the current circumstances, or executing the study is not expected to be valuable, or both.

Care was taken to illustrate traceability, to maintain continuity, and to explain the location of every chapter and section within the greater, iterative cycles. It may yet be confusing to encounter a problem statement in this section, and a different one further on. The reason

for these differences is, as explained in this section, that the problems, questions, and objectives did evolve through the study.

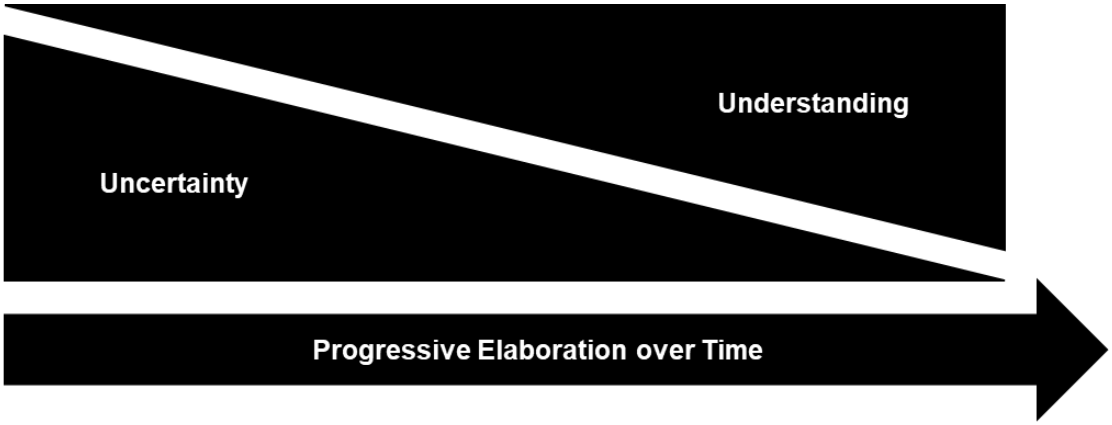


Figure 1.1.2-2: Progressive Elaboration

The iterative nature of the study also points to an exploratory characteristic. 'Progressive elaboration' (Figure 1.1.2-2) is often used in IT project management practice to describe the development from the initial stages of the project to the latter stages. At the start of the project there may be few finalized requirements and goals, and little knowledge of the implications, and vast possibilities. Detail, commitment to specifications and goals, and understanding grows as the project progresses, and uncertainty decreases.

This study was similar in a sense: initially the observations are stated, the detail is low, and the scrutiny occurs at a high level. As the study progresses (and the reporting thereon in this document) the detail increases and the scrutiny intensifies. The reader is implored to take cognizance of this and not get stuck at a point where it may seem that an observation, and the interpretation thereof, results in an unsubstantiated conclusion. Links are provided as far as possible from those high-level descriptions to the chapters and sub-sections where the detail can be found. Also, the detail and scrutiny grow from the earlier to the latter parts.

1.1.3 The Proposition

A Multi-Methodology System as an Approach to IT project management in SA banking is the proposition of this study. The validated design requirements for the proposition are the main deliverable of this study.

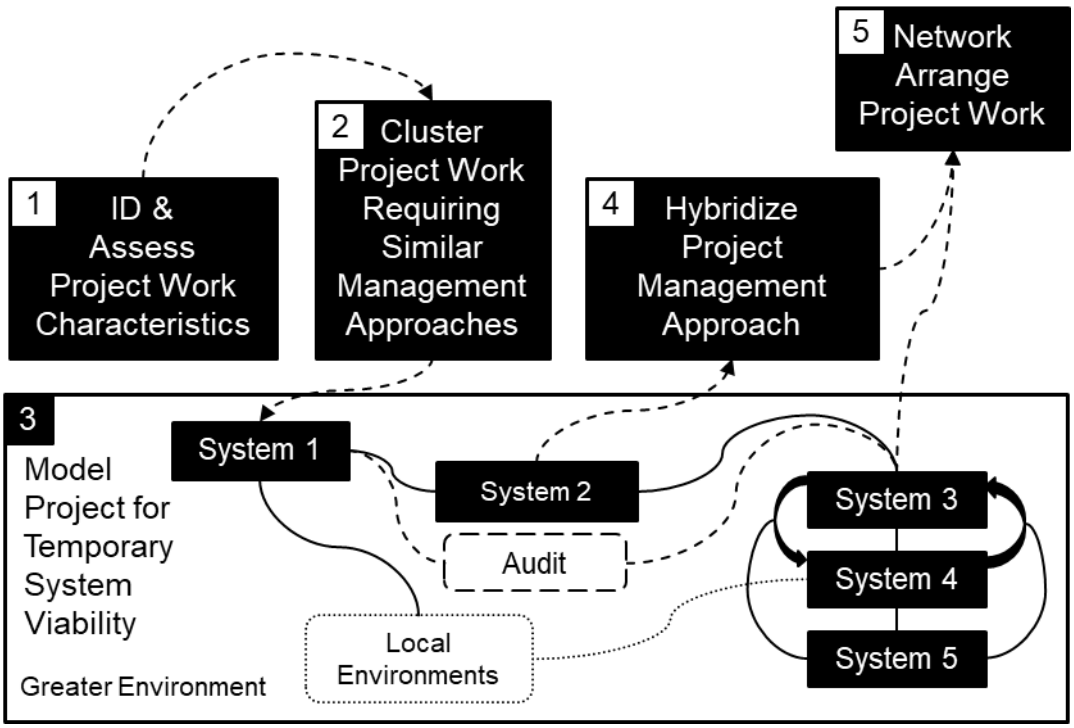


Figure 1.1.3-1: The Multi-Methodology System High-Level Illustration

The Multi-Methodology System constitutes an approach[23] to information technology project management in SA banking, and is made up of four methodological components (refer to Figure 1.1.3-1):

- The Viable Temporary System Model of the project (block 3 in the referenced image).
- The Identification & Assessment of Project Work Characteristics (block 1); and the Clustering of Project Work (block 2).
- The Hybridization (block 4) and Network Arrangement of Project Work (block 5).
- The Methodology Comparison Tool and Guide, which is utilized specifically in the processes of blocks 2 and 4.

The Clustering of Project Work is a method for analysing the characteristics of the project's constituent work.

Having established the characteristics of the work, the Methodology Comparison Tool and Guide enables the hybridisation of unique approaches and methodologies, tailored to the specific needs of the project in question. It does so by describing a process and by requesting responses relating to the characteristics of the project work and the organization,

[23] See 1.2.3 for a clarification of the use of 'approach' and 'methodology' in this document.

and then provide recommendations concerning project management approach and methodology options.

The Network Arrangement of Project Work allows for control and integration to be exercised when simultaneously utilising multiple methodologies in the delivery of a single project.

The design requirements for the proposition are delivered by this research study.

1.1.4 The Research Approach, Validation & Findings

A research approach was created for this study by combining principles and practices taken from the Scientific Method, Soft Systems Methodology, and Design Thinking. This research approach is called the Hegel Circle and is described in chapter 1.3.

The most important aspect of the Hegel Circle as a research approach, is that it prompts scrutiny of observations, conclusions, and responses at each step on the research process before moving on to the next. In the project management sense, it could be referred to as a stage-gating of the research process. The document structure follows the application of the Hegel Circle research approach, and the structure will seem unfamiliar to the reader. The document structure is described in the next section (1.1.5) and in chapter 1.3.

The validation of the proposition of this study – design requirements for the Multi-Methodology System – included aspects of the application of the Delphi Technique to this validation. Furthermore, it was attempted, arguably ultimately unsuccessful, to build falsification into the validation of the research process throughout, as well as the design requirements for the Multi-Methodology System. The application of aspects of the Delphi Technique not being fully fledged and formalized, and the application of falsification not quite hitting the mark, means that the validation can eventually best be termed, somewhat unfortunately, a *Fuzzy Delphalsification*. The formal validations and findings are described in section 0 and chapters 2.6 and 2.7. The validation practice did provide good and defendable feedback though.

The main findings can be summarized as:

- The rationale behind the Multi-Methodology System were not rejected by expert practitioners or peers.
- The design requirements proposed for the Multi-Methodology System were not rejected by expert practitioners or peers.
- The further development of the Multi-Methodology System with the goal of implementation in practice is justified.
- Expert practitioners showed particular interest in the Methodology Comparison Tool a resource that can be utilized for the comparison of project management methodologies, approaches, methods, processes, guides, and the like.

Further conclusions and opportunities for future research are also described in chapter 2.7.

1.1.5 The Document Structure

Part One – Foundational Work consist of the introduction (chapter 1.1), some definitions and clarifications (chapter 1.2), the research approach (chapter 1.3), and the value and limitations of the study (chapter 1.4).

This research initiative which resulted in the proposition and validation of design requirements for a Multi-Methodology System ensued following observations (chapter 2.1) made in practice[24]. The state of information technology project management approaches in general (chapter 2.3) and information technology project management approaches in SA banking (specifically), and directives for future research, were determined by means of literature survey and by obtaining feedback from information technology project stakeholders in SA banking (chapter 2.2).

The design requirements for the Multi-Methodology System (chapter 2.5) were determined as a response to issues identified through review of relevant empirical research, and by designing for adherence to Systems Thinking principles. The design requirements were validated (chapter 2.6) by information technology project stakeholders in SA banking.

The Hegel Circle Research Approach (chapter 1.3) was developed as a research approach for this study. The Hegel Circle Research Dialectic is an overarching framework which allowed for, and mandated, the application of multiple research methodologies. The unique structure of this document is a result of the application of the Hegel Circle Research Approach.

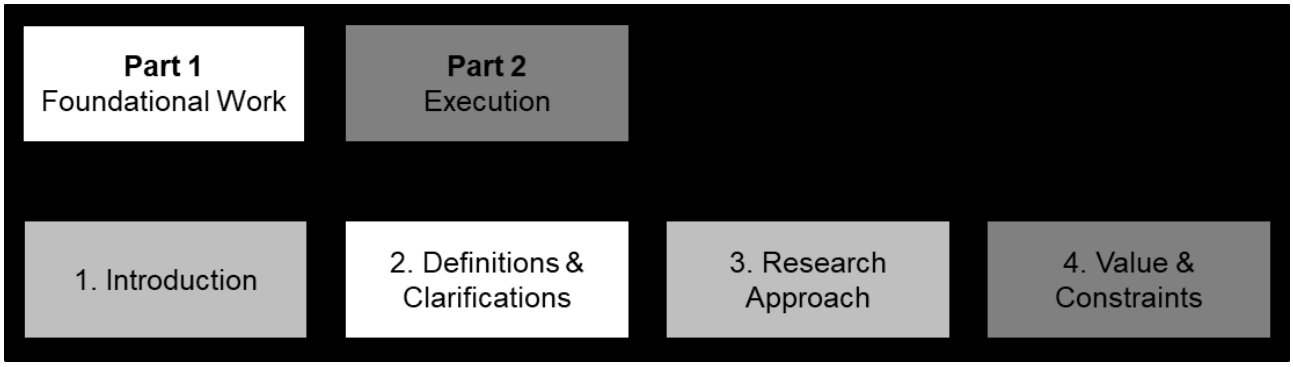
Ultimately, the required and possible developmental directions of project management methodologies and approaches, and the value and shortcomings of this study are considered as conclusion (chapter 2.7) to this document.

[24] The authoring researcher spent a decade fulfilling roles such as information technology business consultant, information technology project manager, and information technology project office specialist in SA, Rest of Africa, and Offshore Banking. Even though conclusions and statements regarding observations made in practice are invariably tested, referenced, or disclaimed, these conclusions and statements are, to begin with, not unfounded.

1.2 Definitions & Clarifications

"You can believe whatsoever you want to believe, however, you can only know that which is knowable."

Dick F. Weissmann



'Project', 'project management', 'project management methodology', and 'project management approach are terms of particular importance to this study. Whereas some commentary is waged with regards to the meaning of these terms, of greater importance is that these terms will be used as described in this section for the purposes of this document.

1.2.1 The Project Identity Crisis – 'Project' and 'Project Management'

In terms of this study, an IT project refers to a piece of work that is proposed, approved, and managed subject to the bank's IT project management governance; paid for from a bank's IT project budget; and contains a significant IT portion. Other characteristics, such as a deliberately finite duration, a specific goal, etc. will count by default.

This implies that it is argued that project management is a subset of organisational change management, which is a subset of organisational risk management; and the project manager is a risk manager. The argument is: the project is that which is called a project, but is more narrowly definable in a limited context; and project management, a subset of organisational change management and organisational risk management, is the management of the managing of the delivery of the work of the project.

There have been many definitions of what a project is, the Prince2[25] definition (AXELOS, 2017) being among the best known. There have also been many definitions of project management and the field of project and project management research. There are no universally agreed definitions for these terms. The well-known "temporary organization with a defined start and end date, specific scope and goals" monikers are arbitrary, since those

[25] 'Prince' is a portmanteau of 'projects', 'in', 'controlled', and 'environments.'

same characteristics apply to many organizations that are neither called projects nor managed as projects.

A simpler, less deterministic definition for ‘project’ is proposed: A project is that which is called a project, but for this narrower context it is added that ‘a project’ refers to a piece of work that is proposed, approved, and managed subject to the bank’s IT project management governance; paid for from a bank’s IT project budget; and contains a significant IT portion.

For project management, a more nuanced definition is in order. The place of the project within the organization needs to be investigated. In every organization, a product or a service, or a range of these, are delivered. The human resource may either be directly involved in the delivery, or manage the delivery, or manage the managing of the delivery, and so on.

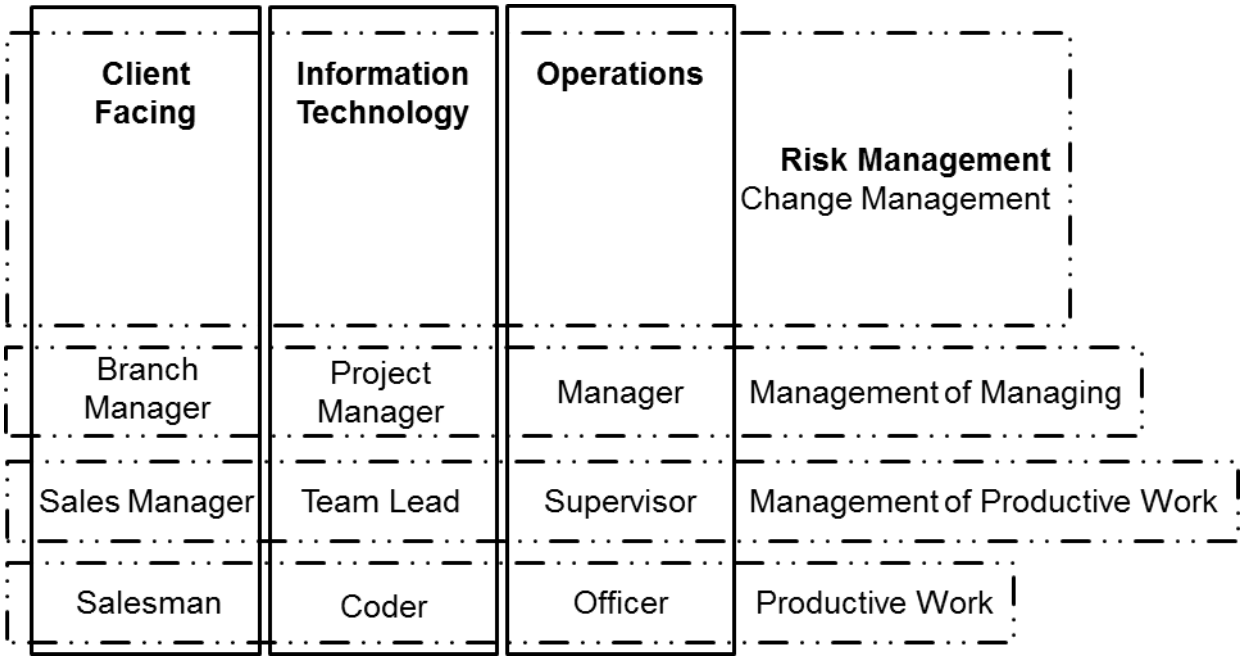


Figure 1.2.1-1: Middle to Senior Management as Risk Management

Figure 1.2.1-1 illustrates a work-management-risk conception of the organization. At the bottom level productive work is done by human resources. One level up the execution of productive work is managed. The team lead (in the IT column) may interpret a technical specification and instruct a team of software programmers to commence with the required coding. The team lead may be a micro or light-touch manager, but ultimately the team lead is responsible for the delivery of his team and will report on the progress one level up to the project manager. The team therefore has a management responsibility in relation to the productive work – the code – that the team delivers.

A project that produces and deploys new code in the organizational systems landscape necessarily delivers a change to the organization. If coding progress is as expected and so reported by the team lead to the project manager, then the project manager integrates this deliverable with the deliverables of the wider project and so doing manages the change – the project manager is therefore in essence an organizational change manager.

If the team lead reports an exception from the expected progress, then the project manager is responsible for managing the associated risk. If it is an acceptable axiom that all change comes with risk, then the project manager and project management forms part of an organizational risk management function.

The higher the level of management assigned to a resource, the further the resource is removed from the productive work, and in pyramidal structures, the more productive resources and team leads make lower-level reports. It may then be inevitable that only significant exceptions warrant direct involvement by the higher management level resource. If this is a tenable representation, the implication is that the management of management skews more in favour of risk management with each higher level of management.

When a resource is directly involved with delivery, there is no difference in essence between processing an account opening and writing a line of code as part of a project or as part of operational work; there is also little difference in the managing of these deliveries. The resource who is managing the managing, however, is starting to manage risk[26] and the higher the level of management the greater the weighting of risk management over the management of production becomes. When a risk or the actualization of a risk reach a threshold of importance, a change will be proposed and managed.

This implies that Organisational Change Management forms part of Organisational Risk Management. Some changes will be project managed.

It is argued that project management is a subset of organisational change management, which is a subset of organisational risk management; and the project manager is a risk manager.

This claim is backed up in SA banking where two of the major banks – Standard Bank and FNB – are phasing out terms like ‘project’ and ‘project management’, and the project manager role, in favour of continuous delivery along the lines of Scaled Agile Framework (SAFe) (Johnston and Gill, 2017) and DevOps[27](Suttie, 2021).

Both SAFe and DevOps remove the layers of separation between the traditional Sponsor, the would-be project manager, and the systems developer, in which case there is direct involvement with delivery and the management of delivery. No longer managing the managing, neither project management nor project manager must be used as terms; the management of the project moves closer to where the real work happens and becomes execution- or delivery management (instead of project management) and will be a subset of change delivery – change delivery being a subset of organisational change management and organisational risk management.

[26] The reader is reminded that risk can be a probable positive or negative deviation from the estimate – risk can refer to threats or opportunities.

[27] DevOps is a portmanteau of ‘development’ and ‘operations.’

The claim that project management is a subset of organisational change management, which is a subset of organisational risk management, and the project manager is a risk manager is also backed up by the constant management of uncertainty in project management; and by the highly developed risk management principles found in the project management body of knowledge (BOK[28]).

The argument is: the project is that which is called a project, but is more narrowly definable in a limited context; and project management, a subset of organisational change management and organisational risk management, is the management of the managing of the delivery of the work of the project.

1.2.2 Project Management and Software Engineering in IT Project Management.

Project management, as explained in section 1.2.1, is a subset of organisational change management and therefore also of organisational risk management in the broad sense. Software Engineering is the part of the IT project management responsible for the delivery of the Software Development component of the project.

Since the Software Engineering component often accounts for the majority of risk associated with an IT project, IT project management and Software Engineering are at times conflated. The IT project in banking goes far beyond Software Engineering though. Apart from other technical components, such as IT Infrastructure, elements such as marketing and training may also be included under the umbrella of the IT project. Software Engineering is an important part of the IT project in SA banking, however, and as such a major argument from Software Engineering was brought into this study. In short: a project in SA banking with an IT component will most likely be referred to and managed as an IT project.

The essence of a project could be argued from many perspectives – the perspective could be from the business and product side – then everything revolves around the product that will be delivered to make money; it could alternatively be from the marketing side demanding better products to market.

The IT-cantered perspective is however not without merit. The Systems Thinking mantra, POSIWID[29] (Beer, 2002, 2004), makes a strong case – the purpose of the system is what it does. There may be reiterative requirements analysis by drawing on trends and expectations spotted by marketing research, product-line considerations, technological possibilities, executable services, resource capabilities, and client characteristics. But, once deployed, banking products are systems that facilitate the transaction of information. The profits made on these transactions are outcomes of the functioning of the system, but the reverse is not

[28] Project management BOK in this case refers to the total body of project management knowledge and not only to the PMBOK (project management body of knowledge) as maintained by the Project Management Institute (PMI).

[29] POSIWID is short for ‘the purpose of the system is what it does’.

true. A business case may justify a system, and the system proves the business case as true or false, but it is not the business case that is coded and deployed. Similarly, the marketing follows the functionality that can be marketed, not the other way around. The training follows concerns the use of the system, not the other way around.

Furthermore, the most advanced project management capabilities are found in the IT teams. This is largely a result of how resources and teams contributing to banking projects are organised, and because of the technical complexities and risks associated with the work delivered by these resources and teams. For example, marketing teams and resources are in most cases treated as sunk cost, and their work does not impact the transactional functionalities of a new banking product. IT teams, on the other hand, are in most cases expensed against a project budget, and their work delivers transactional functionalities requiring integration across multiple systems. For these reasons more advanced project management capabilities had been developed among the IT teams.

1.2.3 Project Management Methodology & Approach

(Gemino, Horner Reich and Serrador, 2021) accepts and continues with the (Špundak, 2014) differentiation that puts the project management methodology at the highest level. The project management methodology is then defined as containing practices, like having daily stand-up meetings. This definition is built on.

Figure 1.2.3-1: The Reactive Multi-Methodology System

The project management methodology is defined as the result of decisions taken with regards to the approach taken to managing the project. Senior management may assume that methodology X, as proposed by a consulting firm and subsequently duly implemented, is the project management methodology, however, in practice the project management methodology rather comes into being as a result of the decisions taken regarding which methods to apply and the constraints at play (Figure 1.2.3-1).

This definition may seem objectionable – the more common notion is that the methodology comes first, and that decisions relating to project management practices will follow. It seems, however, that this prederminism is unnatural and impedes adaptation to the management situation at hand. It is then often the case that practitioners sidestep methodological contraints imposed by, for example, governance (Marnewick and Lessing Labuschagne,

2011) and best practices (Marnewick, 2017); and a growing desire for more natural practices of management in the project landscape may be a cause for the rise in hybrid and mixed method approaches (Komus and Kuberg, 2020).

For this reason, it is not the objective of this study to create an ideal predetermined project management methodology, but rather have a formal framework in place for dynamically creating the project management methodology in response to the demands of the project, and the capabilities and constraints experienced in the organization.

There is a gap in the most current description of approach, methodology, and practices in project management literature. Methodologies consist of a set of practices (Špundak, 2014; Gemino, Horner Reich and Serrador, 2021), but a similar approach to methodologies relation is not stated. It is therefore proposed that the reality, which has been poorly described, is that a project management approach consist of the sum of methodological choices of characteristics utilised in the organisation's management of projects. It is only the multi-methodology system that can have the requisite variety to deal with the complexity of practice. And, it is the multi-methodology system that needs to be formalized in order to significantly improve methodological approaches to project management.

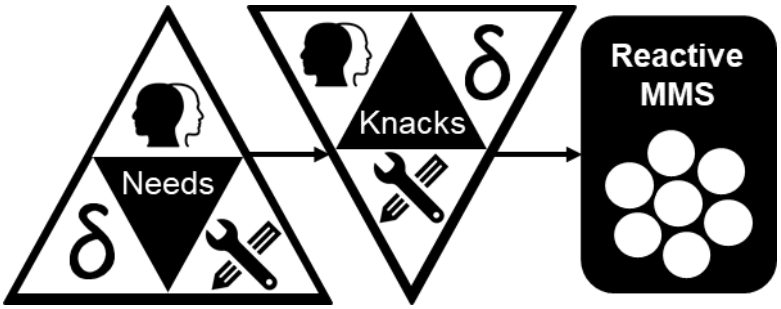


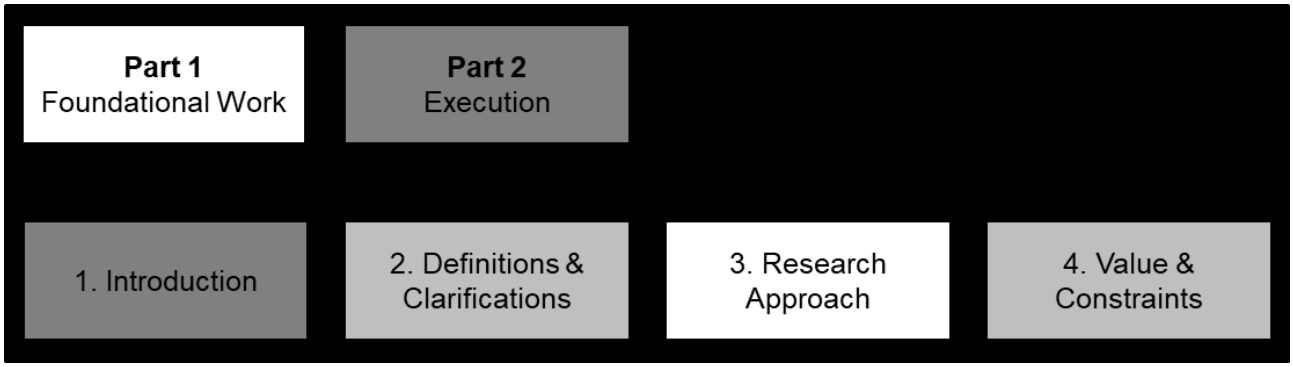
Figure 1.2.3-2: Reactive Multi-Methodology System (Simplified)

The Multi-Methodology System arises (Figure 1.2.3-2) when the characteristics of the project and organization is responded to by drawing on the capabilities and practices available to project practitioners. It is argued that this is what already happens in practice, and that this multi-methodology system needs to be described and formalized in order to take the theory of project management approaches to the next level.

1.3 The Hegel Circle Research Approach

"Truth in philosophy means that concept and external reality correspond."

Georg Hegel



The investigation of research approaches did not yield an approach estimated to provide for the adequate selection and application of research methods and methodologies in the execution of this research study. In substantiation of this conclusion: criticism of the Scientific Method and falsification when applied to social sciences have been well described half a century ago (Jeffrey, 1975); the subjectivism inherent to Soft Systems Methodology pose a risk to a research process (Mingers, 1984; Callo and Packham, 1999; Zaremba and Smoleński, 2000; Armstrong, 2019); and 'Design' approaches can lead to skewed focus (Zimmerman, Stolterman and Forlizzi, 2010; Woudhuysen, 2011).

But arguably more importantly than the referenced works: the myriad of research approaches does not seem to have solved the extant problems in management and project management research. It can be observed that approaches to project management research have been experimented with over the last three decades, with no clear indication yet that the desired improvements have been achieved. These statements are more thoroughly described in Appendix D – The Development of PM Research.

Despite the criticisms, there are still arguments for the inclusion of falsification in social science research (Blackman, Connelly and Henderson, 2004) and in management and operations research specifically (Shareef, 2007; Ormerod, 2009). Similarly, the critics of Soft Systems Methodology (Lane and Oliva, 1998; Zaremba and Smoleński, 2000) and 'Design' approaches (Zimmerman, Stolterman and Forlizzi, 2010; Johansson-Sköldberg, Woodilla and Çetinkaya, 2013) also advocate that these approaches remain useful and can be improved.

The view that certain theories evolve rather than being absolutely falsifiable (Lakatos, 1976; Cooper, 2007), along with the subjectivity in Soft Systems Methodology (Mingers, 1984) and the outcomes focus of design (Zimmerman, Stolterman and Forlizzi, 2010; Woudhuysen, 2011) perhaps explain the disconnect the best. A theory in management practice needs to be readily employable. For example, Taylorism may have been superseded, but it was implementable at the time when it was created. A theory is not valuable to management

practice if it may only be implementable in decade later. Decision makers may have moved on and technology and policies may have changed the context. A theory in the natural sciences is not threatened by an expiry date in the same way. For example, the theory of General Relativity was published in 1916, but technology and opportunity to test some of its predictions only came around to allow a certain test from 2003 to 2019[30]. But the delay did not make the theory less valuable. And management research lies somewhere in the middle. Management practice cannot be analysed without affecting intervention. The management practice is dynamically responsive – it changes when it is analysed and because it is analysed. But, the results of management research are not valuable if the better part of a century is required for implementation and testing.

For this reason, the Hegel Circle Research Approach was developed as an approach to methodology and method selection and application for the execution of this research study. The Hegel Circle is neither completely foreign nor novel. It rather draws from well-known and tried theories and methods. In summary: the Hegel Circle seeks to provide the applicability of Soft Systems Methodology and the 'Design'; but it seeks to add rigour by building the iterative scrutiny of observations, conclusions, and propositions into the process.

Flexibility is not assumed of the reader who invariably requires an exhibition that demonstrates clear markers to well-worn structures and approaches. It is therefore stated at the onset of this section that the Hegel Circle is arguably an improvement, but still includes the characteristics of the widely accepted Scientific Method, Soft Systems Methodology, and Design Thinking. The most noticeable difference, which is expected to cause confusion to the set reader, is the document structure. Note that the document consists of two parts: this first part which lays the foundation, and Part 2 – The Execution of the Research Study.

As will be explained with relation to the feature presentation of this document – the Multi-Methodology System – the Hegel Circle does not prescribe research methods and methodologies, but rather provides a framework to enable an adequate methodological response to the task at hand.

The first principles of the Hegel Circle are:

- Research should produce truthful outputs.
- Research should produce valuable outputs.

In service of truthfulness and value creation, the Hegel Circle prompts various tests of the truthfulness and relevancy of observations and interpretations.

1.3.1 The Rationale of the Hegel Circle

With the Hegel Circle it is attempted to apply the rigor of the Scientific Method in a framework that is suitable to soft paradigm management research. In addition to the scientific method,

[30] For interest's sake, follow this link.

the Hegel Circle draws on Design Thinking, Soft Systems Methodology, and philosophical theories relating to truth, facts, and values.

The development of the Hegel Circle involved an extensive research study investigating common issues in management research and the vast philosophical theory concerning truth, facts, and values. A detailed description of the development of the Hegel would have doubled the length of this text, and may not have constituted a presentation to the optimal audience. The Hegel Circle will therefore be introduced at a high level in this section and explained in the next section (1.3.2) as it was applied to the design and validation of the proposition of this study: Multi-Methodology System for IT project management in SA banking.

Rigor, in terms of the Scientific Method as interpreted by Popper, amounts to enabling the falsifiability of theory (Popper, 1963). Popper acknowledged that different theories allow for different degrees of testability. The question must then turn to the degree of falsifiability that a proposition can feasibly be subjected to within the scope of a research study. Or, what constitutes a feasible and useful test at a step in the research process. To address this question, a framework for the interplay of truths, facts, and values are presented.

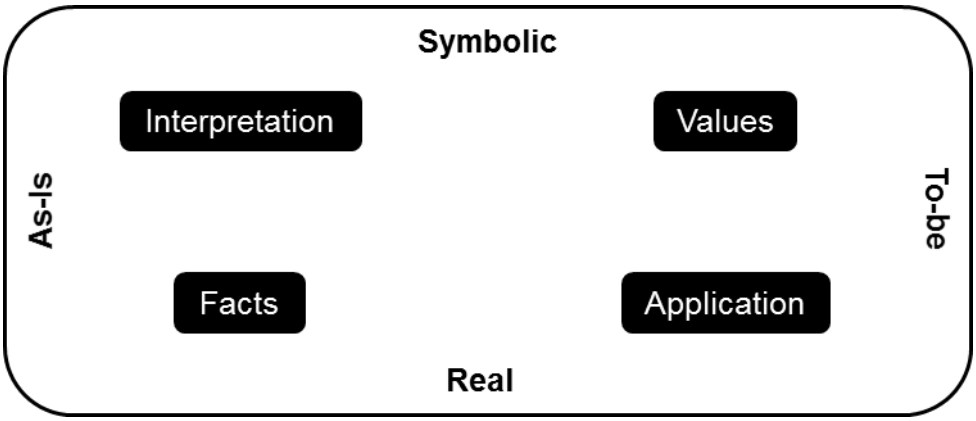


Figure 1.3.1-1: Hegel Circle Rationale (1)

Referring to Figure 1.3.1-1, facts exist in the real world, as it is. These facts are observed and interpreted. The interpretation represents a symbolized version of the world as it is. Values represent a symbolized version of the world as it should be. Application seeks to change the real world to what it could be. The observation of facts, the interpretation of observations, values formation, and applications are entangled. The 'interpretation' is of real-world facts that were observed in a context; and the 'interpretation' occurs influenced by the interpreter's values. Values formation is impacted by what was interpreted, and by the imagined application of the values in practice. Application is impacted by the values held by the actor; and by the context presented by the facts in practice. The present facts are the results of previous applications.

As an example, interpretation being influenced by values, and *vice versa*, refer to Figure 1.3.1-2. A researcher observes that a *successful* project shows evidence of meticulous planning. The held value is that adequate planning leads to project success. The interpretation of the *facts* of a successful project and detailed planning provides an

acceptable thesis, is absorbed and strengthens the held value regarding planning. However, if it is observed that an *unsuccessful* project showed evidence of excellent planning, the interpretation causes tension with the held value regarding planning.

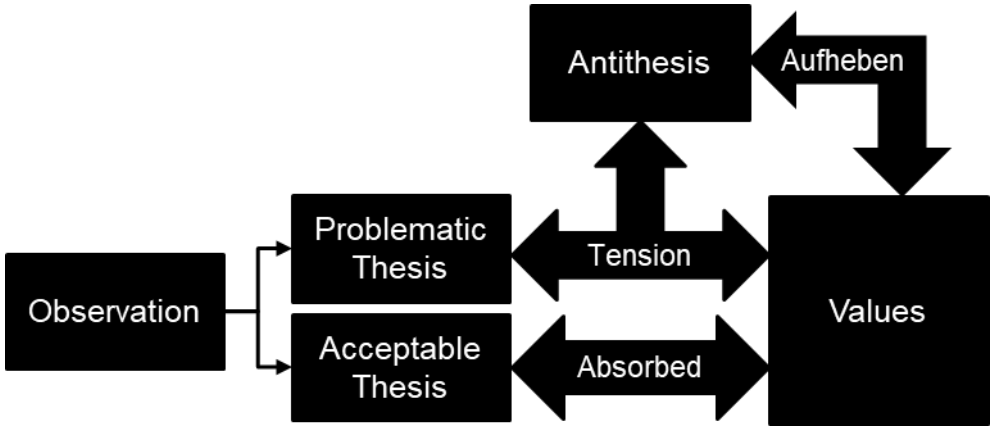


Figure 1.3.1-2: Simplified Interpretation & Values Formation

The antithesis could be that detailed planning does not lead to project success. The eventual outcome of the *aufheben*[31] (Carter, 1980; Thagard, 1982) could be that planning is a requirement for project success, but not a guarantee. This leads to an update of the value system. This tension that occurs when new evidence contradicts (or negates) an existing belief and causes a new belief to be formed (as illustrated in Figure 1.3.1-2) is based on Hegel's dialectics[32] (Maybee, 2020). For this reason, the approach is called the Hegel Circle. Furthermore, it is not only accepted that the dialectical interrogation of ideas would happen occasionally, but it is rather suggested that each observation, interpretation, and conclusion at every step of the research process should be subjected to dialectical interrogation. The hope is that truthfulness and interpretations may be improved by such a process.

With the aim of explaining why this philosophical rabbit hole should be of any utility to an industrial engineering study of IT project management methodologies, it is now attempted to provide the most succinct framework possible for philosophy and to relate it back to Hegel's Dialectics and the world of this study.

The framework is first given by means of five propositions with reference to Figure 1.3.1-3. The five statements will be explained thereafter.

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[31] *Aufheben* is a difficult term to meaningfully translate English. Subjecting an idea to *Aufheben* means both to actively seek to negate the idea, but also to preserve it at the same time. *Aufheben* may refer to 'lifting' as in 'raising' an idea to a higher level or as in lifting a sanction; it also means preservation and negation of the current by that which follows. Practicing a*ufheben* would imply subjecting an idea to the strongest possible criticism, while not throwing the baby out with the bath water.

[32] Hegel's writings are notoriously difficult to make sense of. When challenged I often quip that my misinterpretation of Hegel is among the best misinterpretations that I am aware of. To make sense of the philosophical landscape of metaphysics and idealism wherein Hegel's dialectics are grouped is equally difficult. It is attempted in this section, knowing that those with knowledge of philosophy will find much to criticize. It is hoped that the explanation will be of some utility.

1. Reality contains physical components.
2. These physical components are sensed by actors.
    2.1. The sensing is metaphysical.
    2.2. The worldview may impact the actor's metaphysical sensing of the physical components of reality.
3. The interpretation of that which was sensed is metaphysical.
    3.1. The actor's worldview impacts the actor's interpretation of what was sensed.
    3.2. The conclusions drawn from the interpretation tend towards the synthetic or the ideal.
4. The worldview of the actor is metaphysical.
    4.1. The actor's worldview causes dialectic tension between synthetic and ideal conclusions.
    4.2. The dialectic tension between synthetic and ideal conclusions updates the actor's worldview.
5. The purpose of philosophy is to guide and improve the dialectical process.

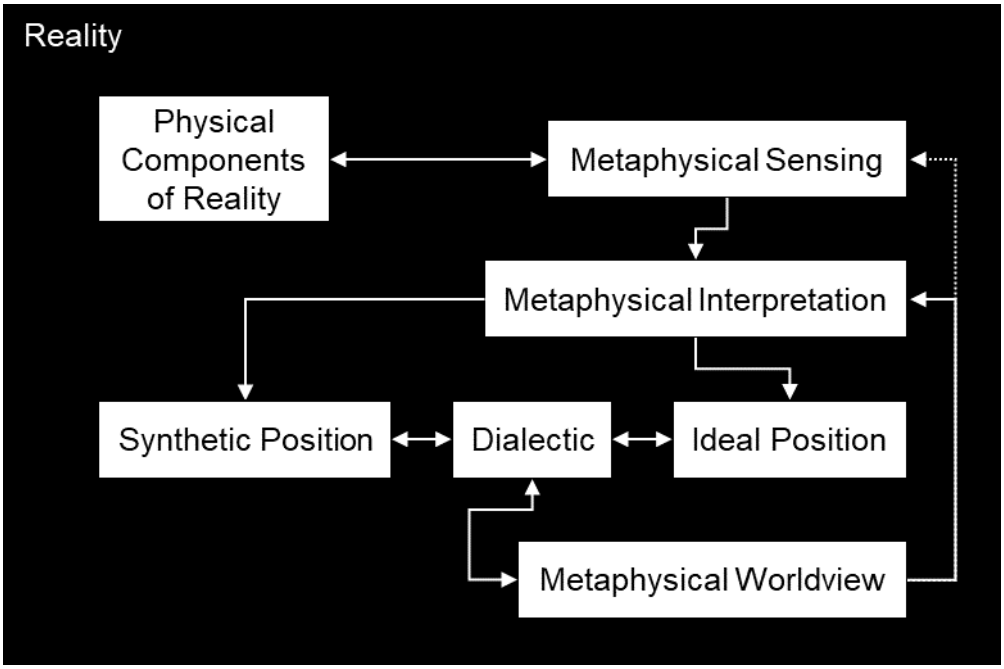


Figure 1.3.1-3: Dialectics and the Metaphysical Worldview

With regards to the first proposition: If there is an IT project, for example, then we can point to physical components of the project – the project team members, physical resources, and even digital resources. Data, information, knowledge, and intelligence are ultimately physical, since it cannot be transmitted, stored, or processed without physical implications. If reality itself is not questioned, then these physical components can be said to be contained in reality.

With regards to the second proposition: Let's assume an external specialist is introduced to and tasked with assisting the project. The specialist's senses encounter the project – the

specialist my see the project's team members and bump elbows with them, the specialist may be added to the project's SharePoint and view the project's documentation. But this sensing is metaphysical, because it is not the physical components that enter into the mind of the specialist, but rather signals emanating from the physical components. Metaphysical therefore does not imply metaphysics in the common philosophical sense (van Inwagen and Sullivan, 2021), but rather as metadata is commonly understood – the set of data that describes and gives information about another set of data. When a physical component is observed, then the physical signals that are physically observed form a set of physical implications concerning the physical component – that is why the physical observation or experience is metaphysical in relation to the physical component that is being observed or experienced.

It is not certain if sensing itself is impacted by the worldview of the actor, or if it is rather the interpretation of what was sensed that is impacted.

With regards to the second proposition: It follows that the interpretation of the metaphysically sensed observation or experience is also metaphysical as it relates to the initial physical component. This interpretation is influenced by the actor's worldview. If the specialist had previously found that formally dressed project teams were averse to risk and change, then being met a with suited and tied team will impact the specialist's interpretation.

It is hoped that the reader's response at this point would be that only the obvious has been stated, even if in an unnatural fashion: one does not hold and interpret a physical team member inside one's mind, light reflecting off the person meets the eye and is transformed into signals interpreted in the brain.

Let's assume that the specialist abhors conformity as represented by the business-formal dress code and that the specialist is certain that persons who dress formally do so only to compensate for a lack of experience, knowledge, and self-esteem. The 'ideal' conclusion in this case is to be suspicious of the project team. This use of 'ideal' relates to the synthetic *a posteriori* (Rohlf, 2020; Guyer and Horstmann, 2021), but with an extension. When a synthetic *a posteriori* position had been found to be true on multiple occasions, and never refuted, then the actor may accept the position as a self-evident truth (Hanna, 2018) – this could be called a stylized *a priori*. 'Ideal' as used in Figure 1.3.1-3 and in the framework, as may have been expected, also includes both traditional types of *a priori* propositions.

The synthetic conclusion in this case would be to accept that a factor had consistently indicated certain characteristics in the past, like dress code indicating a compensation for certain deficiencies in this example; but also, that the present case must be judged in its own context. The specialist's 'ideal' conclusion may have held true for previous projects in Marshalltown, Johannesburg; but a synthetic conclusion would be better if the present context is Canary Warf, London. Now, if the specialist experiences that professionals in Canary Warf dress a certain way for about the same reason that workshop technicians prefer overalls, then a dialectic tension ensues between the 'ideal' and the 'synthetic'. The *aufheben* that plays out is that the ideal conclusion must be rejected on the grounds of the new evidence; but before the baby is thrown out with the bathwater, there is also a part of

the ‘ideal’ conclusion that survives – it may still be valid in some contexts even if it can never be ‘ideal’ again. It could be stated that the stylized *a priori* is returned to its rightful synthetic *a posteriori* position. The metaphysical worldview is updated with this changed understanding.

It is hoped that the reader’s response will still be that only the obvious has been stated, albeit unnaturally: in life we have certain preconceptions, and they are challenged and changed from time to time.

With regards to the fifth proposition (the purpose of philosophy is to guide and improve the dialectical process between the synthetic and ideal positions) This is an adaptation of Bertrand Russell’s definition of philosophy as “something intermediate between theology and science” (Russell, 1946). Whereas having preconceptions and having them challenged and changed from time to time is inevitable, the employment of philosophy towards guiding and improving the dialectical process is argued to be crucial for the following reasons:

- The information processing problem.
- The metaphysical causes physical effects.
- The problem of necessary outsourcing resulting in dogma.

The information processing problem.

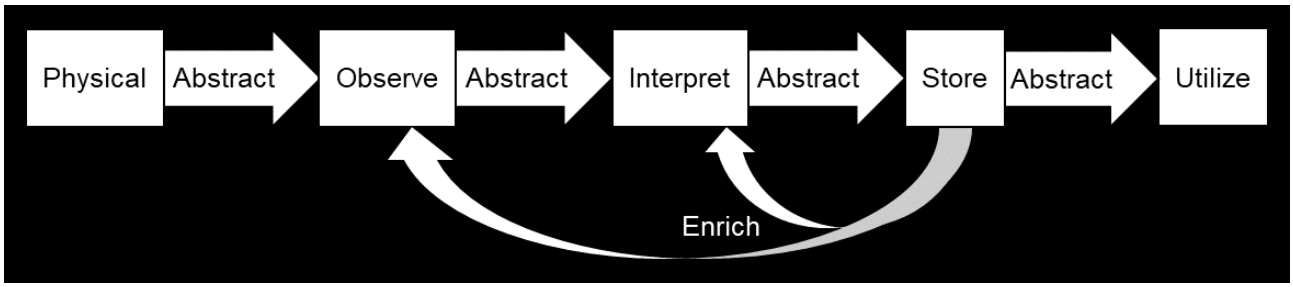


Figure 1.3.1-4: Information Processing - Abstraction & Enrichment

When the specialist sees the project team and observes their clothes, the only signals that enter the mind of the specialist are the light reflecting off the off the persons and the sign-off-driven project lifecycle process map behind them, and perhaps the sound of leather soles on marble tiles, and maybe moist pure-woollen fabric (after an unexpected drizzle) that contends in a mutual smell-scape with a cologne of the same brand too. These steps are constituted by the leftmost two blocks and arrow in Figure 1.3.1-4. These signals are a reduced-data version of the reality experienced by the specialist. For the low-data observation to be sensical, the mind enriches the observation with detail by corresponding the observation to existing internal reference frameworks – this multimodal and meta-modal explanation has long been held in hermeneutics (Krieger and Belliger, 2017) and neurology (Pascual-Leone and Hamilton, 2001), neurobiology (Edelmart, 1998), psycholinguistics (Holler and Levinson, 2019), and neuropsychology (Northoff and Lamme, 2020) have come to similar conclusions.

Referring to the second arrow (abstract) and third block (interpret) in Figure 1.3.1-4, it is furthermore expected that not all of the observed signals can be processed, or at least that a hierarchy is ascribed to the signals that were observed and then processed for interpretation. The processing for interpretation is enriched in a similar fashion to the observation. A further abstraction is expected when the interpretation is stored, with the framework wherein it is stored providing the requisite richness to the stored interpretation; and a further abstracted version is called up as an input utilized in decision making.

It follows from this explanation that the observations and interpretations of the physical is metaphysical. Similar to constructing metadata to describe and give information relating to *the* data, the observations and interpretations of the physical are metaphysical.

Statistically, this sensemaking process could be described as follows:

$$\exists R \ni r = f(P_O) \sim \left\langle \begin{bmatrix} Feat.1 \\ Feat.\dots \\ Feat.n \end{bmatrix}_{Obj.1} \middle| \begin{bmatrix} Feat.1 \\ Feat.\dots \\ Feat.n \end{bmatrix}_{Obj.\dots} \middle| \begin{bmatrix} Feat.1 \\ Feat.\dots \\ Feat.n \end{bmatrix}_{Obj.n} \right\rangle \sim \prod_{Observable}^{Observed} Phy.$$

Equation 1.3.1-1

Equation 1.3.1-1 imply that:

- There exists (∃) a reality (R) that contains (∋) a subset of reality (r). This subset of reality is a function (f) of physical components (or objects) that are observable (P_O).
- The observable physical components ($Obj.1, \dots, n$) have features ($Feat.1, \dots, n$) that are observable.
- The product ($\prod_{Observable}^{Observed} Phy.$) is a subset of physical, observable components for which the sum of observable components and features are the upper limit, and that which is observed is the lower limit. Therefore, the limits, if determinable at all, can only be determined after the fact and estimated before the fact.

$$\prod_{Observable}^{Observed} Phy. \underset{request}{\overset{send}{\longleftrightarrow}} \begin{bmatrix} \alpha_0 & \alpha_1 V_{1i} & \alpha_\dots V_{\dots i} & \alpha_n V_{ni} & \mu_v \\ \beta_0 & \beta_1 A_{1i} & \beta_\dots A_{\dots i} & \beta_n A_{ni} & \mu_a \\ \gamma_0 & \gamma_1 O_{1i} & \gamma_\dots O_{\dots i} & \gamma_n O_{ni} & \mu_o \\ \delta_0 & \delta_1 G_{1i} & \delta_\dots G_{\dots i} & \delta_n G_{ni} & \mu_g \\ \varepsilon_0 & \varepsilon_1 T_{1i} & \varepsilon_\dots T_{\dots i} & \varepsilon_n T_{ni} & \mu_t \\ \theta_0 & \theta_1 M_{1i} & \theta_\dots M_{\dots i} & \theta_n M_{ni} & \mu_m \end{bmatrix}_{Request\&Sense} \sim \prod_{Observed}^{Interpretable} MetaPhy.$$

Equation 1.3.1-2

Equation 1.3.1-2 imply that:

- The observer can receive autonomously generated signals ($\overset{send}{\longrightarrow}$) and can also 'request' a signal ($\underset{request}{\longleftarrow}$) from the observable components ($\prod_{Observable}^{Observed} Phy.$) – an example would be to switch on a light and to then be sent the photons reflecting off physical objects.

- The observer can receive a range of, for example, visual signals ($V_{1,\dots,n}$) that can be sensed. (A, O, G, T, M represent the other senses.)
- $\alpha_0, \dots, \theta_0$ could possibly act as a continuously dynamic vector that assigns a preference for a sense in a given situation. In the example of a specialist introduced to a project team – if all else remains equal and as expected, then audio and visual senses may chiefly be relied on while a project team member explains the goals of the project. If the project team member smelled of alcohol and proceeded to physically touch the specialist, then it is likely that greater priority would be given to olfaction, tactition, and perhaps movement.
- When a range of, say, visual signals ($V_{1,\dots,n}$) are sensed/observed (for example: the project team members, the lifecycle process banner on the wall, the scribbled flowchart on the whiteboard, the interior decorating, shopfitting and other finishes), it may be that some of the physically observable components are not observed at all – this is notated by the 'i' in the subscript $V_{1i,\dots,ni}$. This is similar to dummy variable in statistics that can come into play under certain circumstances and equal zero in others.
- In the simplest form V_{1i} would constitute the sum of visual signals observed relating to a physical component, and α_1 would be the factor in the significance assigned to it. In reality V_{1i} would probably be a function of the signal emanating from the physical component and the observer's sensing; but these would most likely be dynamically responsive to the interpretation of the observed signal (described in the next step). Furthermore, the observer's mind enriches the observed signal and the significance ascribed to it (as illustrated in Figure 1.3.1-4).
- It can be expected that the observations are prone to errors ($\mu_{v,\dots,m}$).
- The product of the observation ($\prod_{Observed}^{Interpretable} MetaPhy.$) is metaphysical in relation to the physical components that were observed, and has as upper limit all that which were observed and as lower limit that which is interpretable (among all that was observed).

$$\prod_{Observed}^{Interpretable} MetaPhy. \xrightarrow{send} \begin{bmatrix} \alpha_0 & \alpha_1 V_{1i} & \alpha_{\dots} V_{\dots i} & \alpha_n V_{ni} & \mu_v \\ \beta_0 & \beta_1 A_{1i} & \beta_{\dots} A_{\dots i} & \beta_n A_{ni} & \mu_a \\ \gamma_0 & \gamma_1 O_{1i} & \gamma_{\dots} O_{\dots i} & \gamma_n O_{ni} & \mu_o \\ \delta_0 & \delta_1 G_{1i} & \delta_{\dots} G_{\dots i} & \delta_n G_{ni} & \mu_g \\ \varepsilon_0 & \varepsilon_1 T_{1i} & \varepsilon_{\dots} T_{\dots i} & \varepsilon_n T_{ni} & \mu_t \\ \theta_0 & \theta_1 M_{1i} & \theta_{\dots} M_{\dots i} & \theta_n M_{ni} & \mu_m \end{bmatrix}_{Request\&Interpret} \xleftarrow{request} \sim \prod_{Interpreted}^{Storable} MetaPhy.$$

Equation 1.3.1-3

Equation 1.3.1-3 implies, similar to Equation 1.3.1-2, that:

- Signals observed through the senses ($V_{1i,\dots,ni}, \dots, M_{1i,\dots,ni}$) may be sent autonomously or after being requested, prioritized ($\alpha_0, \dots, \theta_0$) for type and be ascribed significance individually ($\alpha_{1,\dots,n}, \dots, \theta_{1,\dots n}$) and be subject to error ($\mu_{v,\dots,m}$).

- The product ($\prod_{Interpreted}^{Storable} MetaPhy.$) is metaphysical to the physical components that were observed and has as upper limit all that was interpreted and as lower limit that which the observer can store.

$$\prod_{Interpreted}^{Storable} MetaPhy. \leftrightarrow \prod_{Stored}^{Utilizable} MetaPhy. \leftrightarrow \prod_{Utilizable}^{Utilized} MetaPhy.$$

Equation 1.3.1-4

Equation 1.3.1-4 implies that the process continues provide a product of stored information of which some is utilizable ($\prod_{Stored}^{Utilizable} MetaPhy.$) and utilizable information of which some is utilized ($\prod_{Utilizable}^{Utilized} MetaPhy.$); and it remains that whereas the information is physical, it is metaphysical as it relates to the physical reality that is observable ($r[\in R]$).

Now, again this process may be described in much simpler terms: we are subjective and have blind spots. Or: “we see but a dim reflection as in a mirror.” But, referring to Figure 1.3.1-3, the information processing problem explains in part why the metaphysical interpretation is flawed and why Hegel’s dialectic – the scrutiny of interpretation to the point of negation – is required.

The metaphysical causes physical effects

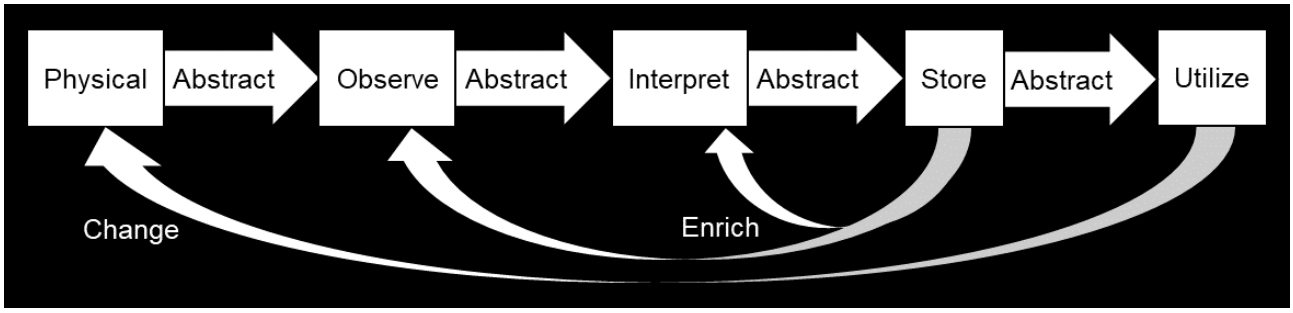


Figure 1.3.1-5: Information Processing - Metaphysical Causes of Physical Effects.

The further problem is, Figure 1.3.1-5, that the metaphysical interpretations stored in the interpreter is later utilized in decision making. It is expected that a further abstracted version is utilized, since an amalgamation of interpreted experiences are utilized in decision making. When the metaphysical decision is acted on, it has physical effects.

At each point of information processing there is a risk of flawed processing, but when a decision is made the physical reality is changed – that is why the biggest risks are found at the decision-making point before implementation. As an everyday example: Absa, FNB, Nedbank, and Standard Bank have significant office space in the square kilometre that is Johannesburg CBD. When gold was discovered in 1884, city planners expected an intense gold rush, but also expected that the city would stagnate (like Kimberley did) after the rush ended, since the nearest perennial waterfront, the Vaal River, was 50km to the south and 250m lower in elevation. The city was therefore laid out with narrow streets and small blocks

– like a gold rush town and not like the economic hub that was to become – and this metaphysically caused physical reality remains to the day.

Referring back to Figure 1.3.1-3 and Hegel's dialectics, especially when decision making has great implications, even the surest 'ideal' conclusion must be subjected to *aufheben*. The purpose of philosophy is to intervene when the 'sure' or 'ideal' conclusion is arrived at, and to insist that the 'synthetic' conclusion should be considered.

$$\prod_{Utilized}^{Utilizable} MetaPhy. \leftrightarrow \prod_{Changed}^{Changeable} Phy. \sim r[\in R] = f(P_O) \sim \prod_{Observable}^{Observed} Phy.$$

Equation 1.3.1-5

Equation 1.3.1-5 implies that:

- Some of the utilizable information is utilized in decision making.
- The product of decision making is that changes are implemented ($\prod_{Changed}^{Changeable} Phy.$) and that the metaphysical information process enact changes physical reality. The upper limit is that which can be changed, and the lower limit is that which was changed.
- The product of the change is a changed physical reality (R) that contains physical components that can be observed ($r[\in R]$) by the observer.
- A further implication is that the full effect of a change may not be observable, or may not, at least, be readily observable due to the dynamic ($\overset{send}{\longrightarrow}$ & $\underset{request}{\longleftarrow}$) nature of observation, interpretation, and utilization.

In light of Hegel's dialectic (Figure 1.3.1-3), the warning is that the utilizable information is 'meta' to that which it describes, and that the utilization of the information has physical effects. In the literal sense bad interpretations of a good world can make the good world bad. The only means by which the utilizable information can be grounded, is to come to the synthetic conclusion, which aims to reduce the removal of the interpretation from the reality that was observed and interpreted.

The problem of necessary outsourcing resulting in dogma.

The process as described from Figure 1.3.1-4 to Figure 1.3.1-5 and Equation 1.3.1-1 to Equation 1.3.1-5 does not imply that all signals are observed and interpreted, it describes the contrary: that there is information loss and that the observation and interpretation is enriched by the observer; and that there are priority and significance ascribed to stimuli, observations, and interpretations. In simple terms: one cannot consider all things.

The project team can get around this problem by employing a 'best practice' project management approach – let's say Prince2. In doing so they don't have to 'figure out' the project delivery process, since it had quite literally already been 'figure out' in the Prince2 flowcharts that they could repurpose and adorn the office walls with. When they run into

problems later on, they bring the specialist on board to get the ship back on course. In taking these steps portions of the information processing were outsourced – both to a ‘best practice’ and to a specialist.

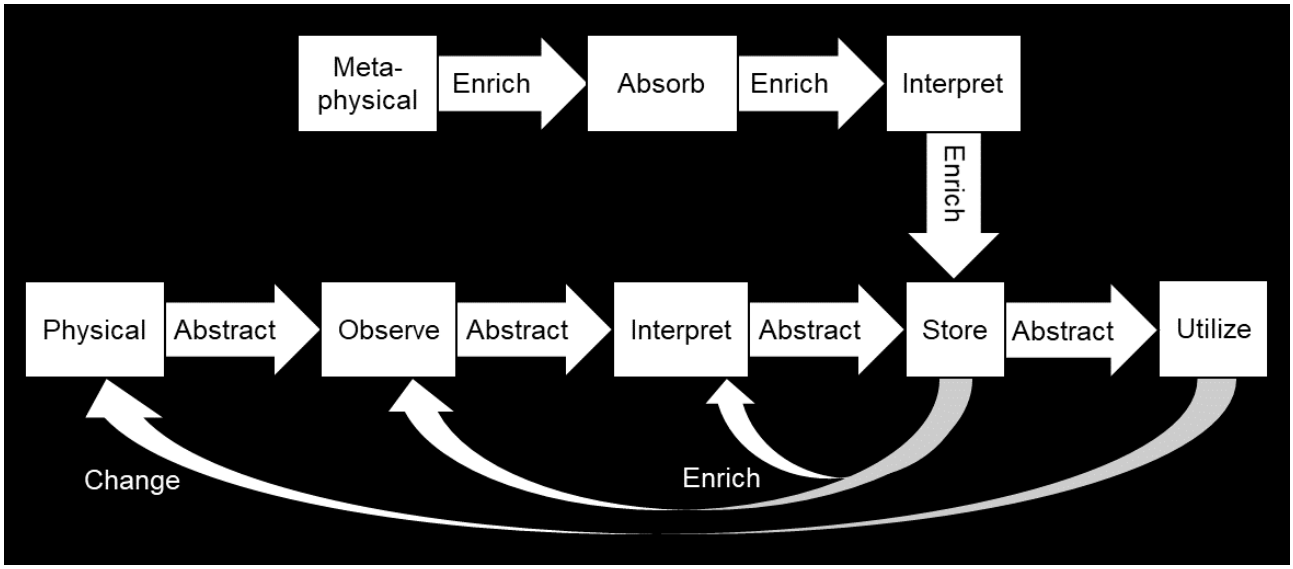


Figure 1.3.1-6: Information Processing - Outsourcing

Referring to Figure 1.3.1-6, the ‘best practice’ and the knowledge held by the specialist is metaphysical to the physical reality of the project. The information acquired in this way is therefore a reduced data (abstracted) version of the physical reality and the consumer enriches the information. This information is absorbed, interpreted, and stored.

Now, it is inevitable that this outsourcing happens – an example is the fact that religion has existed for millennia, and that the post deistic-religious world is not areligious, but rather exhibits growing civil religion (Moeller *et al.*, 2021). Applying Ashby’s Law of Requisite variety and accepting that only variety can absorb complexity (Ashby, 1991), religion, ‘best practices’ and management software can be seen as increasers of variety in order to deal with complexity. Religion and ‘best practice’ can be part of the ‘ideal’ in Figure 1.3.1-3.

Whereas the increase of variety is beneficial, it is now argued that risks emerge when it is assumed that the complexity has decreased. To explain with an example: Prince2 may describe useful processes to follow in the delivery of a project, but once a process is prescribed it is implied that the complexity of project management has decreased. If an exception needs to be raised and approved for any deviation from the prescribed process, then variety has in fact been constrained while the complexity of project management still is what it is.

It is again attempted to describe this problem statistically:

$$\prod_{Utilized}^{Utilizable} MetaPhy. \leftrightarrow \begin{bmatrix} I_{1,1} & \dots & I_{1.n} \\ \vdots & \ddots & \vdots \\ I_{n,1} & \dots & I_{n,n} \end{bmatrix}_{Ideas} \begin{bmatrix} S_1 \\ \vdots \\ S_n \end{bmatrix}_{Significance}$$

$$= \begin{bmatrix} C_1 \\ \vdots \\ C_n \end{bmatrix}_{Conclusions} ;\overset{enable}{\Longrightarrow} \begin{bmatrix} O_{1,1} & \dots & O_{1,n} \\ \vdots & \ddots & \vdots \\ O_{n,1} & \dots & O_{n,n} \end{bmatrix}_{Options} \begin{bmatrix} C_1 \\ \vdots \\ C_n \end{bmatrix}_{Conclusions} = \begin{bmatrix} D_1 \\ \vdots \\ D_n \end{bmatrix}_{Decisions}$$

Equation 1.3.1-6

Equation 1.3.1-6 imply that:

- The actor draws on utilizable information ($\prod_{Utilized}^{Utilizable} MetaPhy.$) when confronted with a situation.
- Ideas ($I_{1,1;\dots;n,n}$) that may be relevant to the situation emerge.
- The ideas are subject to a significance transformation that produces conclusions ($C_{1,\dots,n}$).
- The situation presents options ($O_{1,1;\dots;n,n}$) that together with the conclusions ($C_{1,\dots,n}$) produce possible decisions ($D_{1,\dots,n}$). Reference can be made to the dialectic in Figure 1.3.1-3 between potentially 'ideal' conclusion and the 'synthetic' conclusion that hinges on the 'options' displayed in the physically observed reality.

Equation 1.3.1-6 is of course a bastardization of eigenvalues and eigenvectors of matrices. The natural implication follows: all the equations (and the argument) up to this point deal with possibilities and outcomes, and once a decision has been implemented (or acted upon) the probable functions leading up to the decision collapse. However, this only needs to be the case in the space wherein the physical, observed reality exist. Similarly, measurements of the outcome of the decision that was implemented collapse the process that produced the conclusions ($C_{1,\dots,n}$), but again this only has to be the case in the space wherein the physical, observed reality exist. The metaphysical observations, interpretations, conclusions, and decisions seem to exist in a post-dimensional network space, whereas the physical effects of the implementation of the decision exist in good-old physically observed reality's space and time.

In simple language this means: a person or group can deny responsibility for a decision (and the outcomes thereof) and a conclusion can be maintained even if the evidence contradicts it.

Now, there is value in having 'ideal' conclusions to simplify decision making by improving the enrichment of observations and interpretations (Figure 1.3.1-4), by simplifying information processing (Equation 1.3.1-1 - Equation 1.3.1-5) and by highlighting ideas, conclusions and options (and precluding others) for decision making (Equation 1.3.1-6).

There is even value in denying contradicting evidence when perseverance is required to reach medium- and long-term goals while incurring short-term costs. However, there are also risks that must be managed.

The first risk relates specifically to the temporary organization – the project – whether research or IT project. Whereas operational work may be determinable to a high degree, the project, as defined in section 1.2.1, in essence concerns the management of the risk of change. For a highly conformed operational process, a predetermined, strictly defined method may work perfectly almost all the time. For a project with undefined requirements and implications, a predetermined, strictly defined method may work perfectly almost none of the time. Predetermining methods and approaches imply a collapse of Equation 1.3.1-6 – the variety of ideas, conclusions, and options is reduced when the approach is predetermined. Again, understand the argument: there is variety in the method; employing the method may let it seem as if complexity has been reduced; if the method is then predetermined and enforced dogmatically, internal variety is reduced while external complexity is unchanged.

The second risk relates to the place in the process where a decision is taken and acted upon. If an approach is predetermined, before metaphysical conclusions and options in reality have been processed together, then the type of truth produced may be coherent, but irrelevant, unpragmatic, and may not correspond to the reality where implementation will occur.

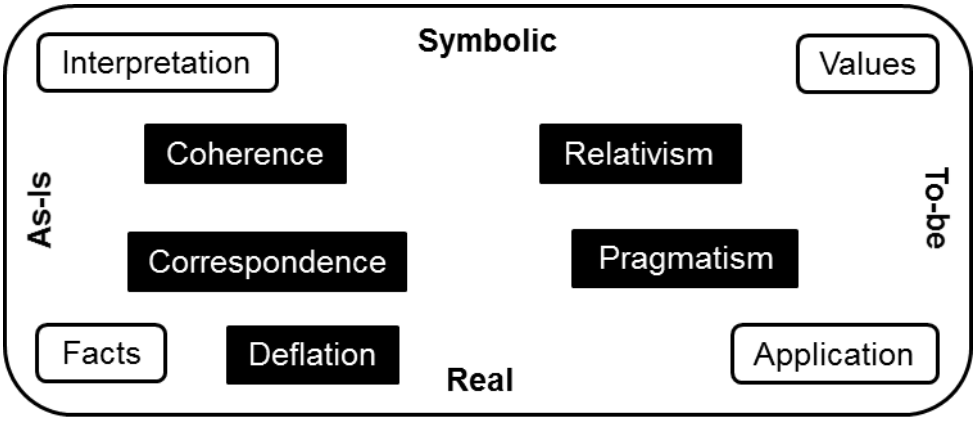


Figure 1.3.1-7: Hegel Circle Rationale (2)

A multitude of theories of truth (Glanzberg, 2018) exist. A few that have particular bearing on this study and management research and -practice are overviewed.

The simplest truth theory is the correspondence theory of truth (David, 2016). Like saying ‘seeing is believing’, a statement is a correspondent truth if it is stated that ‘there is truly a couch in my living room’ and if upon inspection it turns out to be the case. In the symbolic vs real and as-is vs to-be framework of the Hegel Circle (Figure 1.3.1-7), the correspondent truth strongly tends towards the real world, as it is.

If a truth corresponds to reality, it may be deflated as a fact – in this case it was factual that there was indeed a couch in my living room. The deflated statement does not require belief and the truthful statement ‘there is truly a couch in my living room’ is no different from a factual ‘there is a couch in my living room’ statement (Stoljar and Damnjanovic, 2014). In the symbolic vs real and as-is vs to-be framework of the Hegel Circle (Figure 1.3.1-7), the deflated truth is the most direct derivative of the real world, as it is.

Correspondence and deflation look backward at facts that already exist, management science and research, however, needs to find pragmatic truth. For a truth to be pragmatic, it needs to be readily usable and valuable (Bernstein, 2005). For example: if 'detailed planning is important to project management' is accepted as a pragmatic truth, it would advise the creation of detailed project plans. In the symbolic vs real and as-is vs to-be framework of the Hegel Circle (Figure 1.3.1-7), the pragmatic truth tends towards the to-be state of the real world.

The relativistic theory of truth contends that a truth is only applicable within the constraints wherein it is assumed relative (Baghramian and Carter, 2015). For example, it could be stated that 'detailed planning is only possible and important once detail design draws to an end' and that 'only high-level planning is possible and required before detailed design'. Relativistic truth is close to the centre of the symbolic vs real and as-is vs to-be framework of the Hegel Circle (Figure 1.3.1-7) but tends towards the to-be and symbolic when utilized in service of determining pragmatic truth.

Coherent truth can be decided when stakeholders to the project agree on the truth of a matter (Young, 2018). For example, if the stakeholders agree that only high-level planning is initially possible and required, then that is the coherent truth of the matter. To get to the pragmatic truth required for decision making and action, decision makers may draw upon correspondent, deflated, coherent, and relativistic truths. In the symbolic vs real and as-is vs to-be framework of the Hegel Circle (Figure 1.3.1-7), the coherent truth strongly tends towards the symbolic world, as it is.

There seems to exist an odd dichotomy between proponents of disparate theories of truth relating to which theory offers the ultimately important and real truth (Glanzberg, 2018), similar to the false (but resolved) fact-value dichotomy (Putnam, 2007). However, it seems clear that all truth-types have some value and that a truth must be accepted and deemed significant before leading to action.

Now, the importance of understanding the truth types in light of information processing, decision making, and the Hegel Circle, are the impacts of 'ideal' conclusions and the collapse of the process due to predeterminism. This will be explained with reference to the example of the specialist who was assigned to a project team.

Let's assume that the specialist was contracted for two months[33] by the relevant director and tasked with improving the project's delivery. The specialist, after 'initial analysis', sells the director on the idea of implementing management software to improve transparency and reporting. The senior manager takes the executive decision and unilaterally enforces the decision on the team. Referring to Figure 1.3.1-3, the specialist's position is synthetic, because it is the only possibility of having something to show after the two allotted months (and not having anything to show is not an option in consulting), but there is no dialectic

[33] This may seem like an unlikely example, but I have been in this position on multiple occasions. Most absurdly, as part of a three-member team tasked with documenting and improving an entire off-shore bank's processes in two months which were extended to three months shortly after commencing the project.

between the specialist's ideal positions and the synthesis thereof with the reality of the context. The constrained timeline does not allow for information processing (as illustrated in Figure 1.3.1-6 and represented in Equation 1.3.1-1 to Equation 1.3.1-5) decision making that relies on multiple factors (as represented in Equation 1.3.1-6).

When the decision hits the project team, it is not relatable to any truth represented in Figure 1.3.1-7 – there is no correspondence to their context, no coherent conclusion was drawn on the matter between the team members, there is no telling that the proposed 'solution' will be relevant to the needs and capabilities of the team or project, and no surety that the 'solution' will be valuably utilized (pragmatic). It is simply a fact, and not one deflated by the project team, that the director took the 'ideal' position, and that the decision will be implemented. Such a decision decreases the likelihood of getting to the truth of the matter, and risks are incurred.

It is of course so that no project can remain in analysis or planning or design mode *ad infinitum* – at some point a decision must be taken and acted upon and this will collapse the information processing and decision-making process. The Hegel Circle is concerned with navigating the grey areas between the extremes during the research project. It does so by prompting the dialectic (with reference to Figure 1.3.1-3) that tests for the applicable truth (with reference to Figure 1.3.1-7) at stages during the research process. The dialectic responds to the needs and possibilities of the context at the relevant stage. The choice on method follows the dialectic and therefore reposition the acting on a decision (and collapsing information processing) to a point that is arguably more optimal than predetermining research methods before commencing a study.

Management research and practice present cardinal constraints which may not be detrimental to the physical sciences that inspired Popper's thesis. Propositions from management research for management practice deal in truths, not facts. The significance of this proposition, as it relates to a management research approach, is that it warns against rushing to conclusions. There seems to be a surprise among some researchers that traditional approaches to IT project management remain common in practice (Marinho *et al.*, 2019) and that traditional research themes remain dominant in project management research (Padalkar and Gopinath, 2016a). But, as in the example of a well-planned project failing, the project failing negates the idea of good planning as a guarantee of success, but preserves the idea of good planning as a causal necessity.

The 'type' of truth ultimately of interest to management research is a pragmatic, useful truth. 'Wirklichkeit', the 'truth' that Hegel refers to in explaining the outcome of the dialectic, presents a valuable description. The 'wirklich' component refers to an outcome that 'works' – the utility of this truth is that it can be applied and will be found to work. The 'keit' component refers to an illumination, a shedding of light on that which is a valuable truth because it works.

Whereas this section is concerned with explaining the rationale for the Hegel Circle, a similar rationale applies to the argument (chapters 2.3 and 2.5) in favour of the proposition of the study – the Multi-Methodology System for IT project management in SA banking.

1.3.2 The Application of the Hegel Circle Research Approach & the Document Structure

The application of the Hegel Circle Research Approach to the execution of this study is explained in this section. At various steps of the research process, the Hegel Circle prompts scrutiny of the truthfulness of conjectures. Instead of prescribing research methods, the generated feedback directs method selection and application.

Additionally, in so doing the document structure for Part 2 – The Execution of the Research Study is illustrated.

This is a very high-level explanation. It provides an indication of how the research process is approached in each chapter of Part 2 – The Execution of the Research Study, but it does not provide the detailed reasoning behind these decisions. The detail will unfold in the chapters of Part 2 – The Execution of the Research Study.

1.3.2.1 From Observations to Thesis[34]

In SA banking, it was observed (1) that changes to the organisational IT project management approach were implemented frequently and at significant cost and impact; (2) that the realized benefits following these changes did not seem to live up to the expected benefits; and (3) that project management methodology and approach dogmatism was prevalent among project practitioners. The observations are described in the first chapter (2.1) of Part 2.

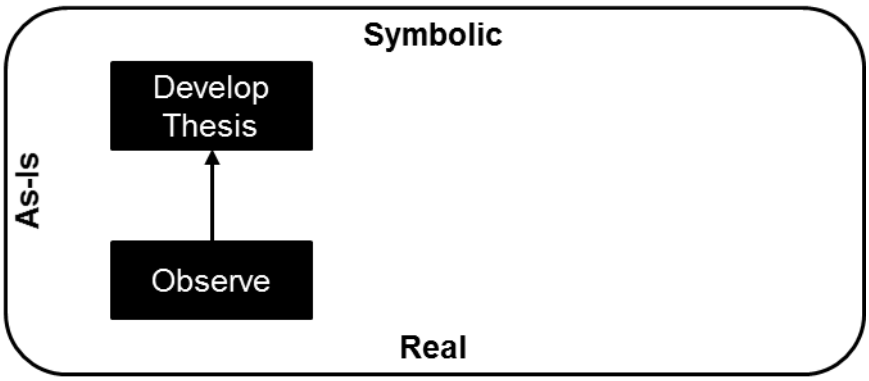


Figure 1.3.2-1: The Hegel Circle - Observation to Thesis

Referring to Figure 1.3.2-1, facts were observed in the real world, as it is. A thesis, or interpretation, or understanding of the real-world situation is sought. The thesis is an abstracted, and necessarily reduced-data, version of the extant facts of the real world. How can the observer be sure of the accuracy of the observation and the understanding gained from it?

[34] 'Thesis' is used here to refer to the understanding that is developed by a person. As an example: My thesis is that broths are spoiled when prepared by too many cooks.

The accuracy of the observation and the truthfulness of the understanding gained from it can be scrutinized for its correspondence to the facts of the real world, and for its coherence to other theses derived from similar real-world settings. This critical development of the thesis is described in the second chapter (2.2) of Part 2.

Correspondence was tested for indirectly by comparing the observations to observations made by other practitioners and factual reports from practice.

Coherence was tested for by comparing the interpretation of the observations to relevant published research and opinions.

The applied scrutiny verified the observation, enhanced the nuance of the thesis, indicated that an opportunity for valuable research may exist, and prompted further investigations.

1.3.2.2 From Thesis to Hypothesis

The thesis was that changes were frequently implemented to organisational IT project management approaches, delivering questionable results; and that project management methodology and approach dogmatism was prevalent among project practitioners. The inference that an opportunity for valuable research existed prompted further investigation. This investigation is described in the third chapter (2.3) of Part 2.

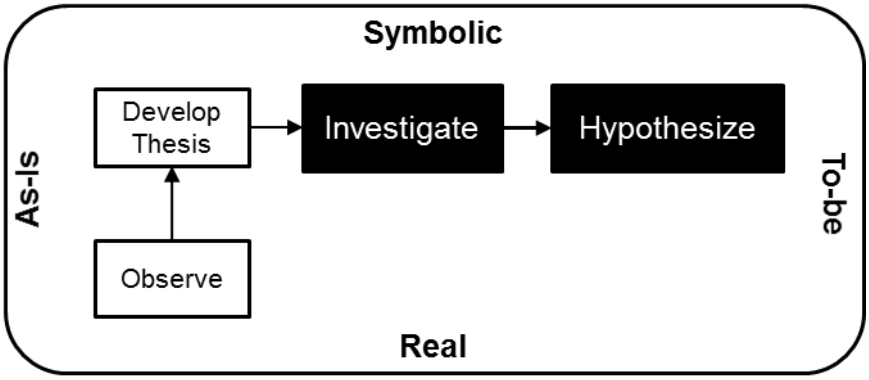


Figure 1.3.2-2: The Hegel Circle - From Thesis Development to Hypothesizing

The state of project management methodology and approach theory and the complexity of IT project management in SA banking were investigated to draw the contexts wherein the research study would play out. Referring to Figure 1.3.2-2, this investigation enriched the abstracted (or symbolic) thesis of the real-world situation as it is. The improved understanding of the situation also prompts theorization relating to possible future scenarios. To scrutinize this theorization, a high-level concept proposal was presented to peers for validation by structured feedback.

The thesis, having benefited from the validation of the concept proposal and peer feedback, prompted an investigation into the root causes of the issues which were addressed by the concept proposal addressed. This investigation was a critical analysis of project management methodologies and approaches in light of selected Systems Thinking

principles. It was found[35] that predetermined project management approaches and methodologies did not adhere to the selected Systems Thinking principles.

It was then hypothesized that designing a project management approach that enabled the adherence to Systems Thinking principles would constitute a valuable research study, and that design of this project management approach would yield propositions that would be of benefit to the theory and practice of IT project management in SA banking. Referring to Figure 1.3.2-2, hypothesizing constitutes the abstract (or symbolic) version of the real world as it could be. Hypothesizing is described in the fourth chapter (2.4) of Part 2.

The statement of hypotheses was included in the Hegel Circle to prompt an ultimate, justification for the research study. It makes the distinction between the success of the propositions of a study and the value of the research study explicit.

1.3.2.3 From Hypothesize to Validation & Report

The envisioned future state may be theoretically sound. It is possible to reject the status quo completely in theory. However, for the hypotheses to be tested, the theoretical inference has to be synthesized with elements of the real world. This synthesis is the creation of the propositions of the study and is described in fifth chapter (2.5) of Part 2.

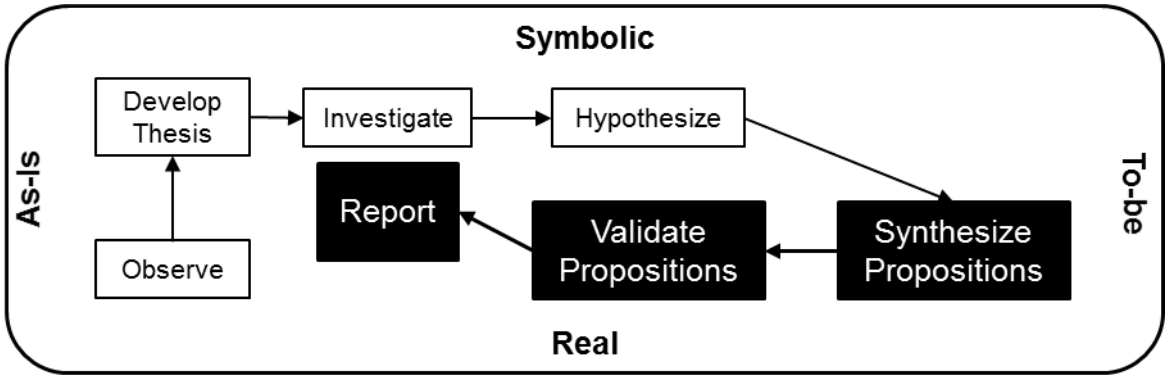


Figure 1.3.2-3: The Hegel Circle – From Hypothesize to Report

There may be some abstract fields, where producing pure theory, if pure theory can exist, may be accepted as a valuable research output. In a practiced craft, like project management, however, the theory can only be valuable if an implication for the practice of project management can be shown.

Referring to Figure 1.3.2-3, the synthesizing of the propositions produces the design requirements of a project management approach which applies Systems Thinking principles. The resultant design requirements for the Multi-Methodology System is required to bear sufficient resemblance to the reality of practice for project practitioners to be able to

[35] The reader I reminded that the purpose of this subsection is simply to give an overview of the methodological process that was followed, and not to explain steps in the process in any details. There are links to the relevant chapters, sections, and subsections that the reader may follow to the view the detail if so desired.

judge its potential usefulness and implementability. The proposition presents a possible future version of the real-world situation.

The design requirements for the Multi-Methodology System were then presented to IT project practitioners in SA banking as a conceptual version for validation. The participants provided structured feedback regarding the conceptual adequacy, the expected usefulness, and the perceived implementability of the Multi-Methodology System. The validation tested the relativistic truthfulness of the underlying theory, since the participants judged the propositions from their contextual perspective. The validation also tested the pragmatic truthfulness of the propositions, since the participants judged the expected usefulness and implementability of the propositions. The validation of the propositions is described in the sixth chapter (2.6) of Part 2.

From the validation of the propositions, it was concluded that the producing the design requirements of the Multi-Methodology System constituted a valuable research study, and that the underlying theory was truthful. The validation feedback was quantified to produce a coherently truthful report on the validation. The validation enabled an observation in practice, or at least as close as the Multi-Methodology System could be brought to practice within the constraints of this study. The process therefore completed the circle.

This entire document constitutes a report of the research process. In the seventh chapter (2.7) of Part 2, specifically, the concluded iteration of the Hegel Circle is reflected on in terms of the findings, the shortcomings, and the retaking of the circle for the further development of the Multi-Methodology System, the Hegel Circle as a research approach, and other opportunities for future research. The report is again an abstracted and reduced version of the findings from practice and presents the produced evidence by which the hypotheses of the study may be preserved or rejected.

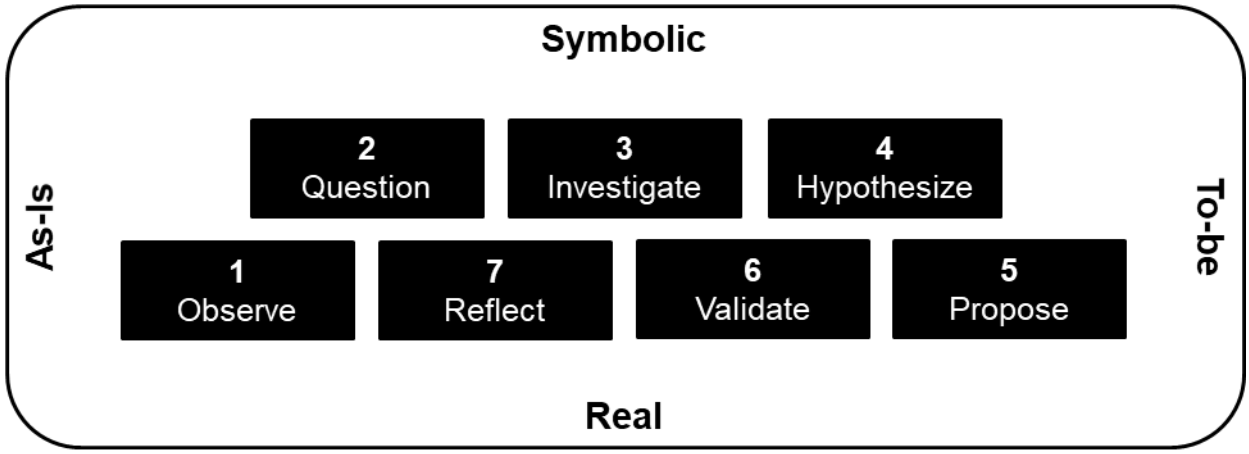


Figure 1.3.2-4: The Hegel Circle Research Approach

Figure 1.3.2-4 represents the illustration of the Hegel Circle that will appear in the rest of the document, the terms used in the process blocks are changed for brevity and relevancy to the research actions and their goals as described in the chapters of Part 2 – The Execution of the Research Study. For example – the last step is to report on the execution of the initiative, but since the entire documents is the report, ‘reflect’ is used in this case. The

chapters also take part of their names from the actions in the Hegel Circle as illustrated in Figure 1.3.2-4.

1.3.3 The Hegel Circle Compared to other Research Approaches

The execution of the Hegel Circle as research approach, as described in 1.3.2, eventually yields seven actions leaning to varying extents toward the symbolic or real, and as-is or to-be (Figure 1.3.2-4). It should already be apparent that all the steps commonly accepted as forming part of the Scientific Method are included in the seven steps mentioned in Figure 1.3.2-4 and described in 1.3.2.

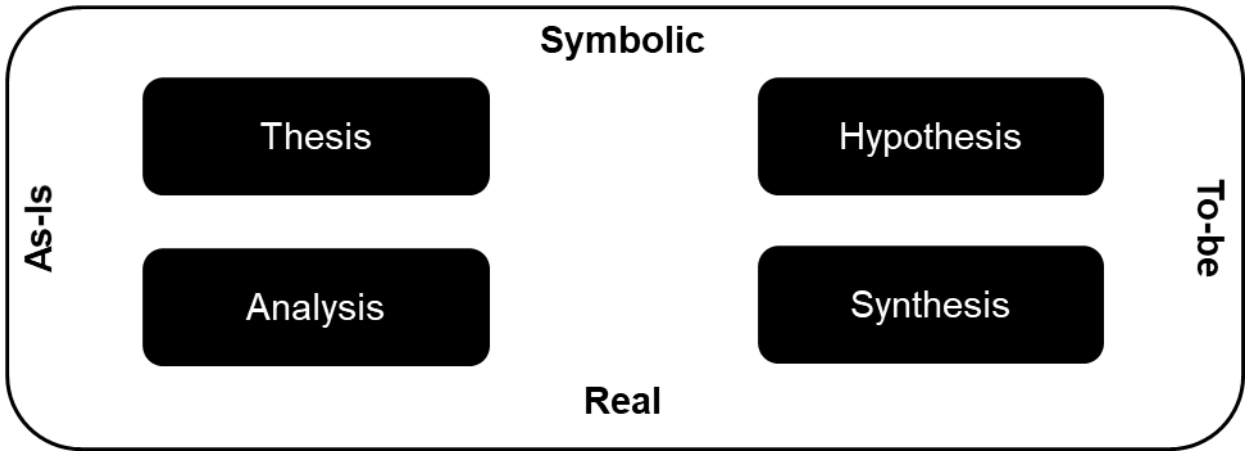


Figure 1.3.3-1: The Influence of Design Thinking on the Hegel Circle

The difference is brought about by the additional tests of truthfulness which are incorporated into the Hegel Circle, and the constraints under which hypotheses can be tested for in the soft paradigm as compared to hard paradigm scientific research.

In Design Thinking axes are described as scales between the symbolic and real, and the analytic and synthetic. Process groups are then described as situated in the quadrants, as illustrated in Figure 1.3.3-2 (Owen, 2007). The interplay described in Design Thinking and the context-influenced processes are helpful, even if elements of the Design Thinking descriptions are unfortunate

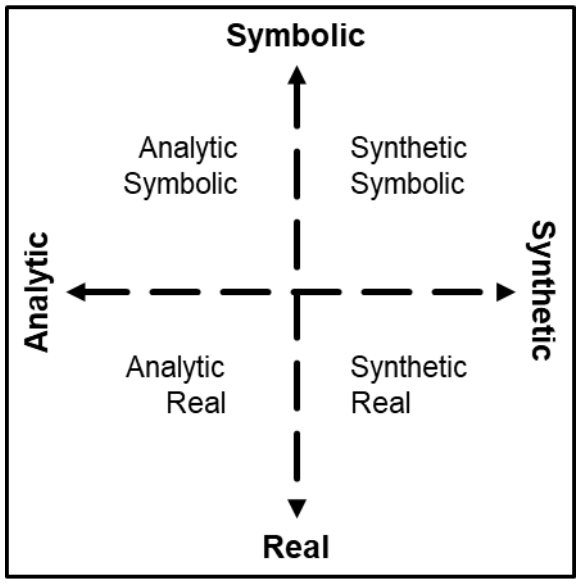


Figure 1.3.3-2: Context & Process Differentiation in Design Thinking (Owen, 2007)

In the first place – having contexts on the vertical axis and processes on the horizontal axis narrows paints the application of this type of description into a corner – or into a quadrant. For this reason, the Hegel Circle sticks to contexts for both the vertical and horizontal differentiations. Most any process can then be situated within the variety of contexts provided for – in the case of the Hegel Circle the processes are summarized as having to with analysis, thesis formation, hypothesizing, and synthesizing (Figure 1.3.3-1).

Furthermore, axes and quadrants illustrate arbitrary boundaries that may be understood as being exclusive, and thereby defeat the entire purpose of a framework that provides a handle for the interpretation of complex situations. For this reason, visually, the Hegel Circle does away with axes and quadrants. The idea being that analysis, for example, can never be totally free from hypothesizing a future state – some tension always exists between all processes and contexts. However, analysis would lean towards the real, as-is state.

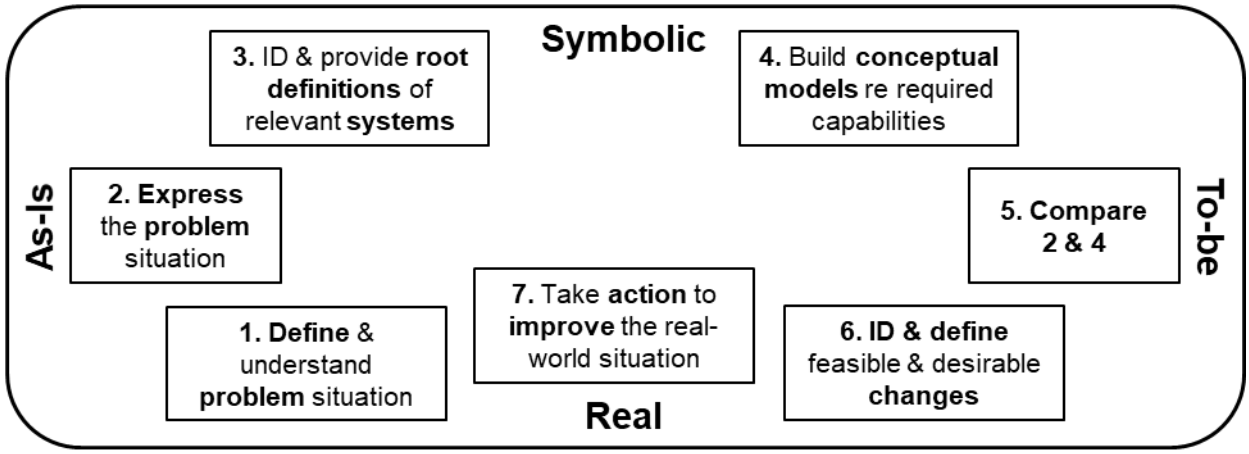


Figure 1.3.3-3: Soft Systems Methodology and the Hegel Circle

Finally, the steps of Soft Systems Methodology can be traced to the actions and contexts of the Hegel Circle (Figure 1.3.3-3).

Soft Systems Methodology already describes a differentiation between the real world and Systems Thinking about the real world (Jackson, 2003). As far as the steps or actions are concerned, steps one to three in Soft Systems Methodology can be traced to the observation and questioning that leads to thesis formation in the Hegel Circle. Differences result from Soft Systems Methodology being geared towards application by a business consultant or other professional charged with business process improvement, whereas the Hegel Circle is developed specifically with project management research in mind. Hence, Soft Systems Methodology would prescribe 'taking action to improve the real-world situation' where the Hegel Circle is concerned with validating the propositions of a study.

Table 1.3.3-1: Hegel Circle Traced to other Research Approaches

Hegel Circle	**Scientific Method**	**Soft Systems Methodology**	**Design Thinking**
Observe	Observation/Question.	Define & understand problem situation.	Empathise Define
		Express problem situation.	
Question			
Research	Research topic area.	ID & provide root definitions of relevant systems.	
Hypothesize	Hypothesis		Define
Propose		Build conceptual models re required capabilities.	Ideate
		Compare conceptual models to problem situation requirements.	Prototype
		ID & define feasible & desirable changes.	
Validate	Test with experiment.	Take action to improve the real-world situation.	Test
	Analyse data.		
Reflect	Report conclusions.		

In conclusion, the Hegel Circle is neither completely foreign nor novel. It rather draws from well-known and tried theories and methods. With reference to Table 1.3.3-1, the Scientific Method, Soft Systems Methodology, and Design Thinking each play to the requirements of the field of origin and the manoeuvres possible in the context and when working with the relevant content, for example:

- Following the Scientific Process in hard paradigm research: when it is hypothesized that a quark exists which 'causes' larger particles wherein it is contained to exhibit mass, then the hypothesis is also the proposition of the presented theory.
- Employing Soft Systems Methodology as a business process engineer: the propositions of the initiative are required to be implementable; and are tested when implemented in practice.
- Executing the Design Thinking Process as an industrial designer: Understanding of the situation is sought. The propositions of the process are ideas and prototypes. Chosen prototypes are tested when chosen for implementation.

Each of the methods referred to are of utility in their optimal settings. The Hegel Circle is customized for soft paradigm research by building formalized scrutiny of observations and interpretations into the process, and by proposing an approach to rigorous validation where testing, implementation and absolute falsification is not possible within the constraints of the research project.

The tracing of characteristics between different methodologies in Table 1.3.3-1 is certainly contentious. Not only is it an apple-pear type of comparison, but there the areas where each of these methodologies would be seen as a good fit also differs. Interpretations also differ as it relates to the methodologies, the constituent practices, and the applicability of these to different research situations. The irony of presenting the Hegel Circle as cyclical and non-deterministic and then producing a table containing deterministic traceability and linearly sequenced actions are not lost. The greater argument is more subtle than the table and accompanying explanation may seem and simply seeks to state: there are similarities between the different methods and perhaps more similarities than proponents of specific methodologies often wish to acknowledge[36] (Ralph and Oates, 2018) (Schulz *et al.*, 2020) (Baptista *et al.*, 2021) (Yasir and Jasim, 2020).

The structure of Part 2 – The Execution of the Research Study – follows the actions of the Hegel Circle, with each action constituting a chapter. This structure indicates the execution of the research study by applying the Hegel Circle Research Approach.

[36] One of the common themes, that may be identified throughout the document, is that methodology dogmatism is met with suspicion. This is the case for research methodologies and theories of truth as outlined in this chapter, and also for project management methodology dogmatism. It is attempted to offer to offer an antidote to the seemingly prevalent ideological binarism of the day where accepted views are held as 'right' and 'good' while treating opposing views (and their proponents) as 'wrong' and 'bad'. To me it seems self-evident that all methodologies have strong suites advocated by well-intentioned proponents, and that hybridization is more effective and efficient than fundamentalism. At least, there are suggestions of lowered information acquisition among dogmatic persons, a higher prevalence of fake news spreading among biased persons, and higher staff turnover in dogmatic organizations. Apologies, once more, for not referencing in the footnotes – since Mendeley cannot cite from MS Word footnotes, references are provided in-text and separately.

The rejection of binarism can be summarized by quoting Norm MacDonald: "The idiot sees the world as Good vs Evil. The cynic sees the world as Evil vs Evil. The truth that no one seems able to see is that the world is, and always has been, a battle of Good vs. Good." By extension it could be added that the argument between agile and traditional, or SAFe and DevOps, is not about right versus wrong or good versus bad, but rather an argument of right versus right and good versus good with the aim of getting better.

1.3.4 Chapter Conclusion

The purpose of this chapter was to provide a brief explanation of the rationale of the Hegel Circle, and to explain how the document structure of Part 2 – The Execution of the Research Study follows – follows the structure.

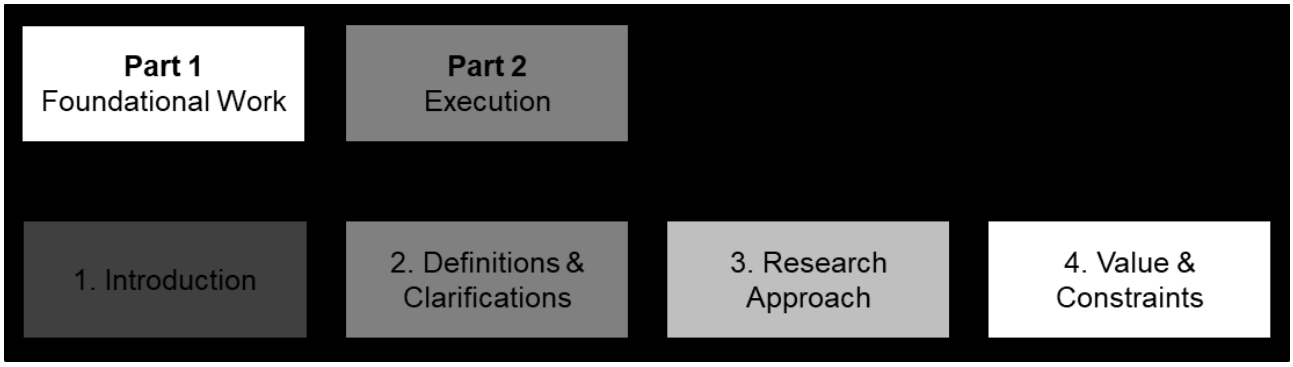
The reader may be left wanting for a deeper explanation[37] of the Hegel Circle. It is hoped that the workings of the Hegel Circle will sufficiently unfold in the chapters of Part 2 – The Execution of the Research Study follows – follows the structure.

[37] A thorough description of the Hegel Circle has been written but was excluded from this document due to its length. It will be completed as a separate work for submission after the present study finished.

1.4 Value & Limitations of the Study

'Results! Why, man, I have gotten a lot of results!
I know several thousand things that won't work.'

Thomas Edison[38]



1.4.1 The Value of the Study

The following contributions are presented by this study:

- Design requirements for the Multi-Methodology System as an approach to IT project management in SA banking, which consists of:
  - The Viable Temporary System Model of the large, complex IT project in SA banking.
  - The Methodology Comparison Tool and Guide for the Hybridization of project management approaches and methodologies.
  - The Clustering of Project Work approach to the assessment of project work.
  - The Network Arrangement of Project Work.
- The Hegel Circle research approach.

The value of this study to the theory of IT project management methodologies and approaches is brought about by the Systems Thinking assessment which both identified the limiting factors of predetermined project management approaches and advised the development of the design requirements for the Multi-Methodology System to allow for variety, adaptability, and control. This is an important addition, since the theory of project management approaches and methodologies do not currently offer an explanation for the results delivered by recent success factor analyses (Khoza and Marnewick, 2020; Gemino, Horner Reich and Serrador, 2021) and recent findings indicating the staying power of plan-based approaches (Marinho *et al.*, 2019). Furthermore, a more holistic and applicable perspective of the complex IT project in a large organization, like SA's major banks, is derived from the Viable System Model (VSM).

[38] This quote has also been attributed to Benjamin Franklin and has appeared in multiple variations.

Even though the area under focus is IT project management in SA banking, it is argued that the theory-contribution will benefit project management theory in general. The case for the generality of project management principles is outlined in Appendix A – The Generality of PM Principles.

The value of this study to the research field and fellow researchers follows from the proposed directives for further research, and from the claimed enrichment of the theory of IT project management methodology and approach. If the theoretical additions are reliable, the foundations have been reinforced. Be these additions unreliable, it is hoped that productive rebuttals may be spurred to the benefit of theory, research, and practice. The Hegel Circle research approach provides an alternative approach to soft paradigm (Pollack, 2007) project management research.

The benefit of the Multi-Methodology System to the application of project management methodologies and approaches to the practice of IT project management in SA banking is twofold. In the first place, immediately useful requirements for the comparison and hybridization of project management methodologies and approaches are provided. Although requiring considerable intervention and commitment, the Clustering and Network Arrangement of portions of project work delivery will provide for a comprehensive intra-project and inter-project dependency profile. This dependency profile will also enable portfolio-wide planning, and risk and issue impact assessment.

Concluding the contribution to the application of IT project management methodologies in SA banking, design requirements are produced from which technical specifications can be derived for future implementation.

The claim to the value of the Multi-Methodology System and its components to the practice of IT project management in SA banking is derived from the validation (chapter 2.6) of the design requirements as it was presented to a sample of expert IT project practitioners and stakeholders in SA banking. The response was overwhelmingly positive; the validation did not provide grounds for the rejection of rationale of the Multi-Methodology System; and particular interest was shown in the Methodology Comparison Tool.

Value is presented to the theory and further research of IT project management in SA banking, and beyond; as per the validation, the propositions are expected to be valuable to the practice of IT project management, and beyond; and particular interest was shown by practitioners in the Methodology Comparison Tool. However, the goal will remain to further develop the Multi-Methodology System and to implement it in practice – this will prove or disprove the ultimate value of this study to the practice of IT project management in SA banking.

The significance of the study and the proposition, and the specific incorporation of Systems Thinking principles expanded upon with reference to Figure 1.4.1-1. Whereas observations, interpretations, and responses are ‘personal’ in the sense that the authoring researcher for this study made certain observations, interpreted these and acted upon them in one way

while another person could have taken a different approach, there were also many forces directing the study.

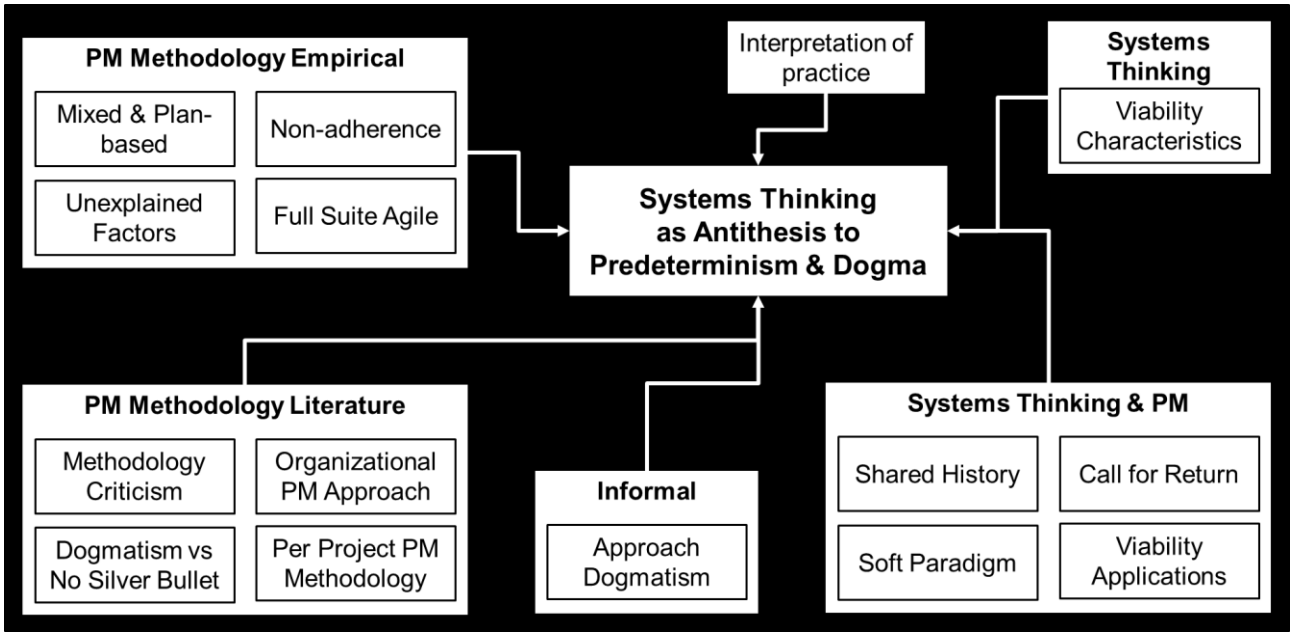


Figure 1.4.1-1: Why Systems Thinking & Why Significant?

In this document the pull of empirical project management methodology research, theoretical project management methodology research, project management blogs, the history of System Thinking in project management theory, Systems Thinking propositions, and interpretations of practice will unfold. This unfolding will support the case for the need for this research and for the specific approach taken, irrespective of the success or failure of the eventual propositions.

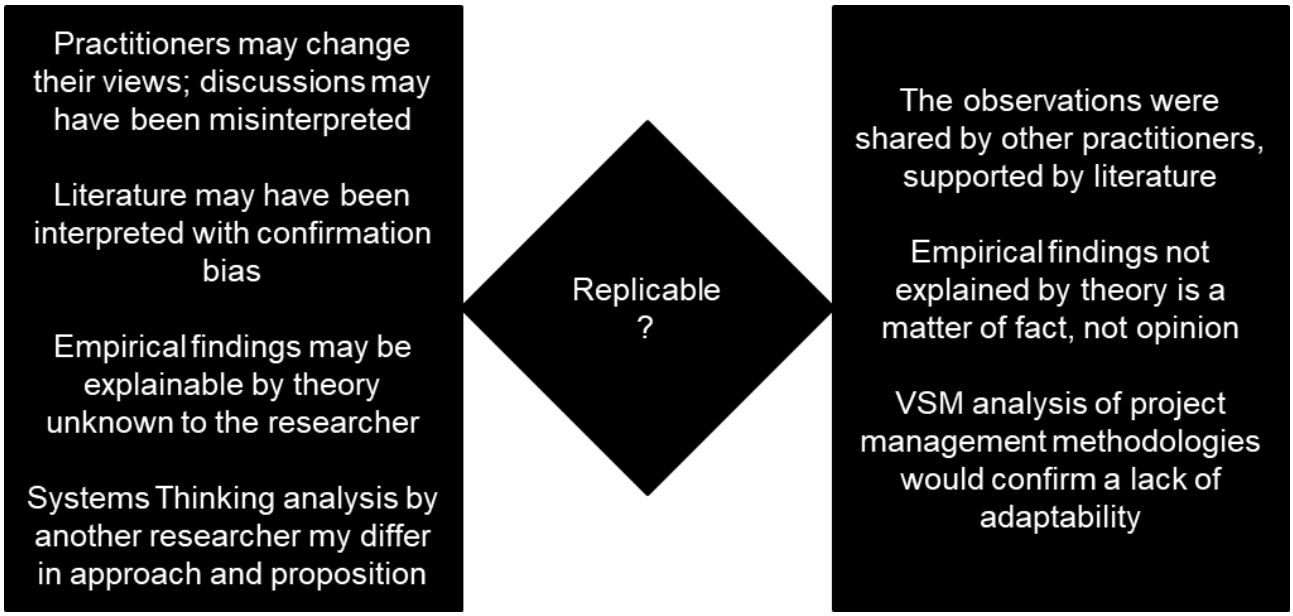


Figure 1.4.1-2: Replicability

The study is expected to be conditionally replicable, with reference to Figure 1.4.1-2.

There are reasons why the study may not be replicable. If practitioners change their minds, if different (non-Systems Thinking) analyses are used, if the authoring researcher were simply mistaken in the approach taken, the conclusions, and the literature reviewed. The study may also be replicated and find similar results if the same sector is focussed on and if a Systems Thinking approach is again followed.

1.4.2 Novelty

The Multi-Methodology System is an attempt at formalising approaches and methodologies of IT project management in SA which are already informally at play in practice. It is not possible to deliver a large, complex IT project in SA banking following a single, predetermined approach or methodology. The project manager naturally, and necessarily responds to the complexity of the large complex project in a large, complex organisation and industry, by employing multiple approaches and methodologies.

The conceptualisation of the Multi-Methodology System is proposed as an improved theory-picture of practice. It is therefore a novel theory of practice. Then, it is argued that a formalisation of the reality of practice provides for better understanding of IT project management in SA banking; and enables improved control and the introduction real improvements to project delivery processes. It is therefore also a novel theory for practice.

The Multi-Methodology System as a whole is novel in the sense that it is innovative. Since the claim is that the reality is better described, it is not inventively novel.

With regards to the Methodology Comparison Tool, it is claimed with apprehension[39] (Friedlander, 2020) that it is novel at all, since the expectation is that such a tool must exist.

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[39] I must explain myself as clearly as possible here. Every project manager has been in the position where project stakeholders pull in different directions and challenge the estimates. After having had the estimates changed to the tune of their whims, they expect these estimates to become prophesies. It is perhaps because of this experience that I am very hesitant to claim value and novelty.Anything can be dressed up as novel, and yet there is nothing new under the sun. Anything can be valuable today and worthless tomorrow, and vice versa. More than a hundred million ‘new’ songs are released each year and they all sound the same. No new music has been composed since the death of Richard Strauss that deserves to be remembered 200 years from now, yet the value of those ‘new’ songs translate into a couple of billion dollars in revenue only from streaming and sales in the USA.

Anecdotally, I was a management consultant on a business transformation programme that ran from 2010 to 2011 at Standard Bank. Among other things we implemented management information and workflow systems, and configured these to integrate to the bank’s Prince2 based IT project management approach. Along with the Prince2 training and certifying of the practitioners, a *bells-and-whistles* people-process-tools solution had been established. Arriving back at Standard bank for the first time in five years, for the validation sessions of this study, I found that the intricate Prince2-based process had been replaced by vast open-plan floors where project and programme teams collocated; and the systems had been replaced by floor-to-ceiling white boards around which practitioners passionately engaged while vehemently drawing functional blocks to represent their ideas and connecting these with arrows to frame their arguments. Now, if any semblance of staying power is assumed when ‘value’ and ‘uniqueness’ are claimed, due caution should be practiced when making the case for it.

I feel that I must apologise for not playing along, and I know the requirement of novelty and value, but the more I think about what novelty and value mean, the less I understand it. So, I point with hesitation to the aspects that may be seen as valuable and novel, but also maintain that these are fragile claims about fuzzy requirements.

Although an amalgamation of project management approaches and methodologies (Axelos, 2018), and an integrated guide to the management of projects, programmes and portfolios (Praxis Framework, 2014) have been published in text, nothing similar to the Methodology Comparison Tool could be identified. Again, there is nothing inventive about designing a tool with wiki-functionality or comparing methodologies and approaches, but it is innovatively novel.

By extension, the Guide to the Methodology Comparison Tool for the hybridisation of project management approaches and methodologies is innovatively novel. An aspect that may be very helpful and have not been identified elsewhere, is the simple logical process for determining whether the foundational project management approach for a project should be waterfall, agile, or hybrid (section 2.5.6).

The application of the VSM to IT is not new (Shaw *et al.*, 2004; Räkers and Rosenkranz, 2008; Murad and Cavana, 2012; Bathallath, Smedberg and Kjellin, 2016, 2019). However, it is novel for it's up and down scaling of the model from the organisational to the project-component level, and for the foundation that it lays which enables the hybridization of the Multi-Methodology System.

The Clustering of Project Work is a process for the identification and assessment of project work. It would not be impossible to prove some novelty, because it is a process with some detail – if two rivers are long enough, they'll differing bends. However, the detailed identification and assessment of project work is not a new idea – it is newly presented as part of this study's proposition to enable down-stream functions. The Network Arrangement of project work bears resemblance to the Gantt Chart, the novel contribution being a breakdown to what would be the work-package level in a Gantt Chart and specifying intra- and inter-project resource, information, and artefact dependencies.

The Hegel Circle research approach draws upon the Scientific Method, Soft Systems Methodology, Design Thinking, and existing theories of truth, facts, and values. Once more, the Hegel Circle an innovatively novel research approach, but by no means an invention.

1.4.3 Scope, Limitations, & Constraints

"The client's idea of a proper limit for the project scope: $\lim_{x \to \infty} f(x) = \infty$*"*

Dick F. Weissmann

The main deliverable of the study is the design requirements for the Multi-Methodology System for IT project management in SA banking. All work taken on during the execution of this study resulted from the Multi-Methodology System emerging as a response to observations (chapter 2.1) and research (chapter 2.3), and the development of the design requirements for the Multi-Methodology System (chapter 2.5).

The scope of this research study, therefore, started with the (1st) objective of the research of answering the initial and highest-level question of the research: *What are the needs and*

possibilities for the further development of project management approaches in SA banking IT? This first element of the scope was to conduct the necessary background research to be able to present a proposition to the initial, high-level question of the research. The outcomes the background research was necessity of bolstering IT project management methodologies and approaches with the Systems Thinking principles of requisite variety, system viability, emergence, and adaptability.

The second question of the research followed: Could a proposition be designed and presented which would incorporate the Systems Thinking principles of requisite variety, system viability, emergence, and adaptability?

The second element of the scope is the (2nd) objective of the research to address the second question of the research. The Multi-Methodology System was proposed, and is made up of three components:

- The Viable Temporary System Model of the large, complex IT project in SA banking,
- The Cluster-Network Arrangement of Project Work, and
- The Methodology Comparison Tool.

The third element of the scope pertained to the (3rd) research objective pertaining to the validation of the propositions of the study – the Multi-Methodology System. The validation was required to test the hypotheses (and null hypotheses) pertaining to the value of executing the research study, and the value of the propositions of the study.

Lastly, the final element of the scope relates to the describing the implications of the outcomes of the study and providing future research directives.

The study is constrained in terms of the setting under investigation, the choice of Systems Thinking principles as a critical theoretical input, and the *triple-constraint* or *iron triangle* of project management.

The setting under investigation is limited to IT project management in SA banking. There are three main reasons for this limitation:

- The bulk of the authoring researcher's experience pertains to this setting.
- The observations leading to the inception of this research study arose in this setting.
- It was possible to access practitioners from this setting for input to the design requirements for the Multi-Methodology System, and for the eventual validation of the design requirements.

Systems Thinking principles are chosen as a critical theoretical input mainly because Systems Thinking was known by the authoring researcher. A hammer-nail[40] risk is incurred and accepted. In the greater body of project management research a wide variety of theoretical foundations are utilized (Bredillet, 2008; Söderlund, 2011a; van der Hoorn and Whitty, 2015a; Geraldi and Söderlund, 2018a), and there precedence exists for the application of Systems Thinking to IT project management (Yeo, 1993b; Crawford and Pollack, 2004; Kapsali, 2011a; Sheffield, Sankaran and Haslett, 2012). The risk may

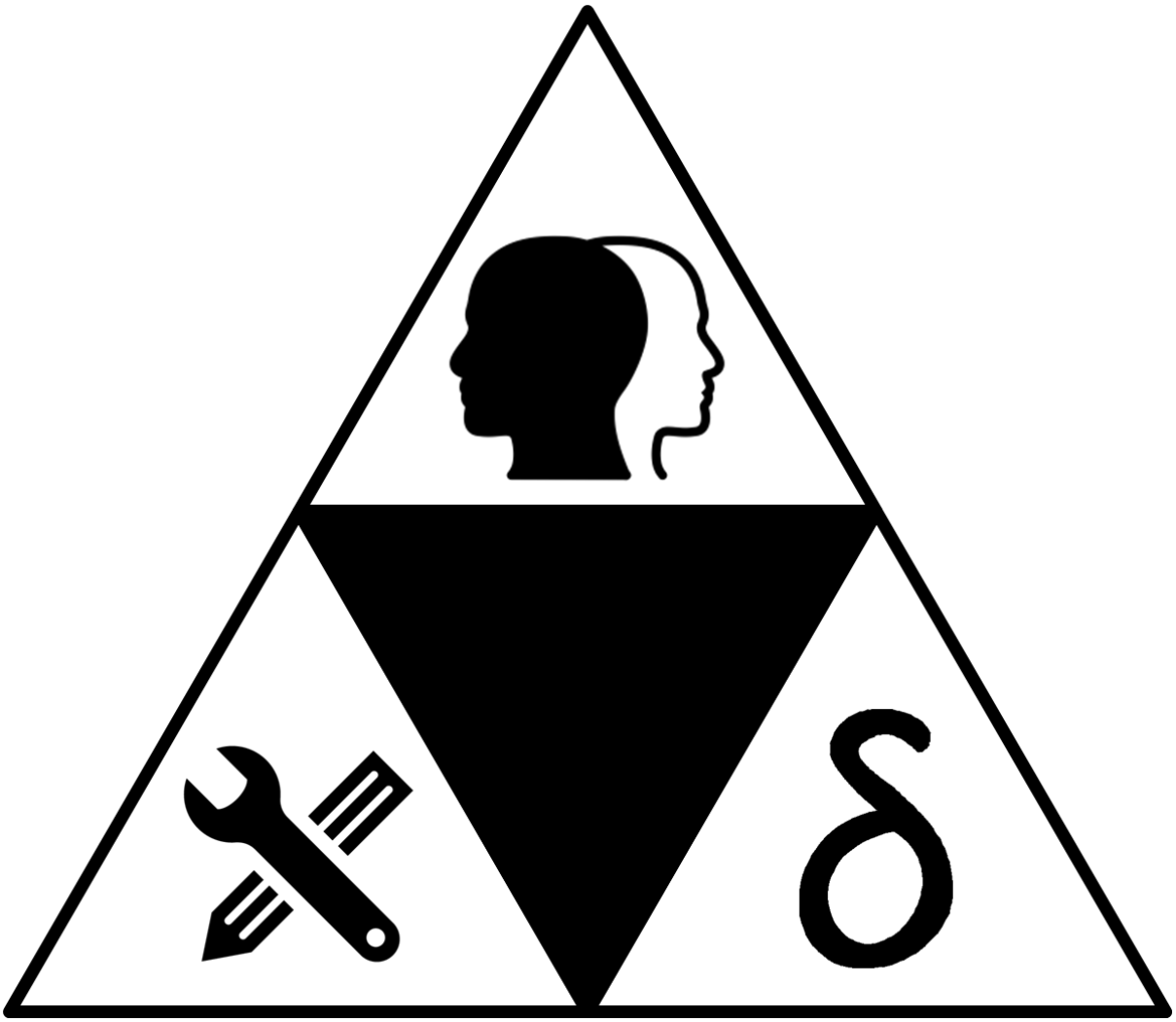
[40] The hammer-nail risk refers to the adage "If all you have is a hammer, everything looks like a nail".

therefore have a negative impact on the value of this research study, but fits well within the variety of theoretical approaches to project and project management theorizing.

In terms of the *triple constraint* or *iron triangle* of project management:

- The research study has to adhere to the quality requirements of the partial fulfilment of the relevant qualification.
- The study was slated for completion by the end of 2020. Whereas the development and the validation of the design requirements for the Multi-Methodology System and was completed within the schedule, the completion of the thesis exceeded the allotted timelines. A formal request for extension was submitted and approved.
- The research study was self-financed by the authoring researcher. The chief direct expense related to travelling and accommodation for input and feedback gathering from practitioners.

The area under investigation is limited to IT project management in SA banking, however, project management principles have repeatedly been found to be general across industries and geographical regions. This is expounded in Appendix A – The Generality of PM Principles.



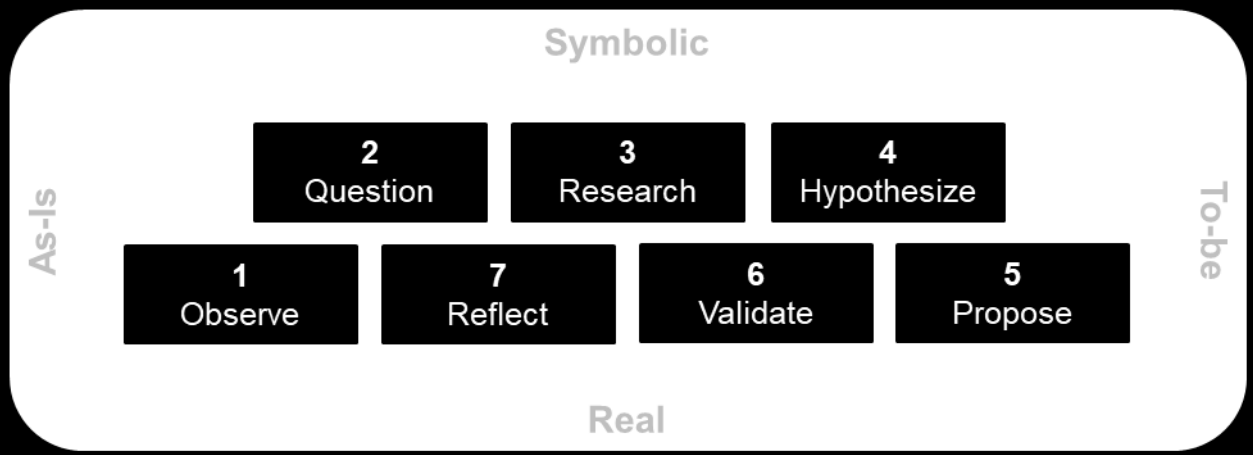
2 Part 2 – The Execution of the Research Study

"It is not possible to live in this age
if you don't have a sense
of many contradictory forces."

Rem Koolhaas

Part 1
Foundational Work

Part 2
Execution



Overview of Part Two

Part Two describes the research process, following the Hegel Circle, of journeying from the initial observations the eventual development and validation of the design requirements for the Multi-Methodology System.

This description of the research process may bare resemblance to the peculiarity of presenting a personal experience narrative as not only new to the narrator, but also novel to the recipient. As example: A project manager may speak of a project issue and the action taken to resolve the issue as if it was the first time such an issue had impacted a project and as if the response had never been imagined by another project manager.

In the case of this text the observations are stated in chapter 2.1. The accuracy of the observations is then put to the test in chapter 2.2. When it is found that the observations are accurate, the value of the observations for research is questioned. Thereafter the investigation turns to identifying a means of addressing the observed situation. Describing this process in the first two chapters of Part Two may be like conveying the personal experience narrative as novel, not knowing that this exact process had been executed by almost every previous researcher. Even if this is the case, the description of the process may indicate that due care was taken in establishing the eventual problem statement, research question, and research objective.

Furthermore, the project management research reviewed in section 2.2.2.1, chapter 2.3, and described in further detail in Appendix D exhibited a tri-polarization. Factor analyses measured success factor response to project management approach and methodology changes (Khoza and Marnewick, 2020; Gemino, Horner Reich and Serrador, 2021). Project-as-practice research were recommended (Winter *et al.*, 2006; Pollack, 2007) and developed (Blomquist, Hällgren, Nilsson and Söderholm, 2010; Geraldi and Söderlund, 2018b), and is a growing project management research approach. And then there are published literature reviews (Svejvig and Andersen, 2015) and published literature reviews of published literature reviews (Padalkar and Gopinath, 2016a), and analyses of trends and key words (Pollack and Adler, 2015). However, whereas analyses of success factors and literature reviews provide valuable insights and project-as-practice research provide useful feedback to the researched practice, a theory-practice gap remains (Lloyd-Walker, French and Crawford, 2016; Turner, Kutsch and Leybourne, 2016). In short, the analyses investigate outcomes without addressing the causes, and the practice-based research address causes in a practice without producing generalizable outcomes.

Endeavoring to not merely repeat what is already being done with success, and hoping to locate some Lagrange sweet spot between the three well-established poles, the observations were not addressed by immediately deriving the final problem statements, research questions and objectives for the study. Rather, chapter 2.3 starts by investigating the development of project management approaches and methodologies, and then a next step for the development of project management approaches and methodologies is conceptualized. The concept was presented to peers and practitioners as a sense-check on the logic and to obtain feedback (section 0).

It may be noted that a mini-iteration of the Hegel Circle had been completed at this point – observations were interpreted, problems were identified, questions for research arose, objectives for research were acted on, background research was conducted, a concept was developed, the concept was taken to peers and practitioners, the concept was not rejected and thereafter the further development of the concept can commence.

In section 2.3.4 and 2.3.5 a Systems Thinking explanation for the issues relating to IT project management approaches and methodologies in SA banking, and possible responses, are described. It is at this point that the final problem statements, research questions, and research objectives are stated for the project:

- The problem statement concerns project management approaches and methodologies' shortcomings in enabling Systems Thinking principles relating to viability.
- The research question concerns the possibility of developing an approach to project management which does adhere to Systems Thinking Principles relating to viability; and, if possible, if this action is expected to be valuable to the theory and practice of IT project management in SA banking.
- The objective of the research is to address the research question by developing and validating the design requirements for the Multi-Methodology System.

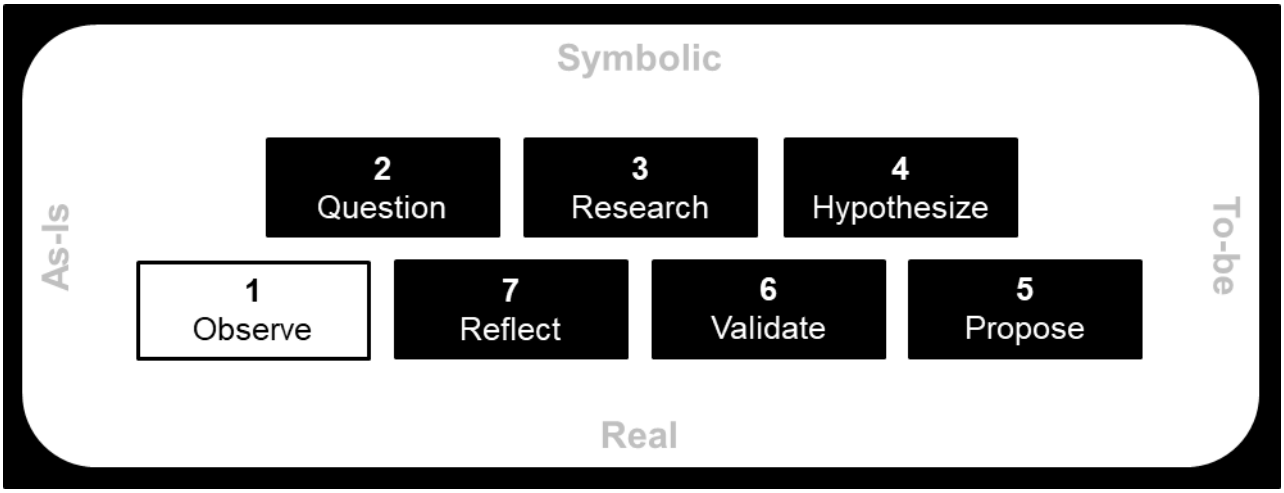
Thereafter it can be (and must be) hypothesized (chapter 2.4) that the execution of the research objective will add value to the theory and practice of IT project management in SA banking. The research objective is acted upon, and the research question addressed by developing (chapter 2.5) and validating (chapter 2.6) the design requirements for the Multi-Methodology System.

Chapter 2.7 reports on the findings and the issues and implications of the study are reflected upon.

2.1 Observe – Observations Made in Practice

"First, we guess it… [audience laughter] *…no, don't laugh, that's the truth."*

***Dick Feynman**,*
lecturing, regarding the process of establishing laws in physics.



Observations made in practice, while involved with IT project management in SA, Southern African, rest of Africa and offshore banking since 2010. This involvement was mainly as a business consultant responsible for the improvement of organisational project management, project office development, the training and coaching of project practitioners, 'troubled project' support, business process improvement, management information systems implementations – and not separable from these items – project management methodology implementation and improvement.

It was observed[41] that:

- The major banks of SA[42] implemented changes to IT project management approaches and methodologies frequently, and at significant cost.
- A dogmatic belief existed among project practitioners, and other project stakeholders, that an optimal project management methodology exists and would be a *silver bullet* to the challenges faced in IT project management.
- It is not clear that consulting projects aimed at the improvement of project management approaches and methodologies, and the resulting changes implemented to the project management methodology and approach, delivered the proposed benefits by which the changes were sold.

[41] Observations are necessarily biased, even if accurate. The reader is reminded that the study starts from observations, but that these observations are tested by various means. These tests are described in the next chapter (2.2).

[42] Absa, Capitec Bank, FNB, Nedbank, and Standard Bank are SA's major banks, and are also referred to as *The Big Five* banks.

In terms of the Hegel Circle, the observations drawn in practice are the initiators of the investigation that lead to the research study. During the remainder of this chapter, the observations are explained in more detail, and the implications and importance of these observations are pondered. It should be noted that although this chapter is not the start of the document, it does describe the start of the study. The observations are the result of the author's experiences and speculations and is only required to clear a low bar of rigor. During the next step of the Hegel Circle, the observations will be scrutinized (Question – the Validity of the Observations).

2.1.1 Frequent, Impactful Changes Implemented to the IT PM Approach & Methodology

With regards to the first observation: All five of SA's major banks, and an additional major Southern African bank, have implemented significant changes to their IT project management methodologies and approaches over the last half a decade or is in the process of doing so.

Three causes could be deduced for these changes:

- Revolutionary business transformation, like the centralization of IT and other support (also often referred to as 'enablement') functions.
- Evolutionary business transformation, like the development from a loosely defined project management approach to a more formal approach capable of producing predictable management information.
- Kingdom building. This occurs when newly appointed executives seek to implement wholesale changes.

IT in SA banking initially developed in product and function related silos. It was common to have a product owner of, for example, the Card division in personal banking, with one or more project managers reporting directly to the product owner. Business analysts, software engineers, and the like would report directly into this line. These project resources were treated as sunk costs and could therefore be put to work as the product manager decided.

The benefit of this setup was that IT project resources developed an intimate knowledge of the product and the technology that enabled the product. This setup was also *de facto* agile, because the project resources were co-located and maintained direct communication with the client of the project. The downside was that functionality across the bank was developed in isolated silos. Furthermore, IT infrastructure was at risk and folklore of products being housed on a server below the product owner's desk are common. These accounts extend to include occurrences where an accidental kick to the server could lead to a product going offline momentarily.

Three of the four older major banks embarked on the centralization of IT project delivery and IT infrastructure since the 2000s. Whereas the benefits to IT infrastructure were clear, it was argued that centralized project delivery teams would be able to deliver more projects at a

lower cost, and that integration across the existing silos would improve. These changes are defined as revolutionary changes.

In order to manage the newly centralized IT teams, management information and management information systems were required. Furthermore, additional requirements for governance had been created. These requirements necessitated the implementation and following of project management approaches which would enable monitoring and control of project selection, financials, resource allocation, infrastructure planning, release planning, and more. Whereas projects were *de facto* agile by default before centralization, waterfall approaches, derived from Prince2, the PMBOK, ISO[43], and IBM[44] (through consulting services and consultants), were common.

One of the four older major banks maintained a decentralized, 'minimum governance' approach until 2019, and has since initiated the implementation of DevOps as an approach to IT project management.

A common criticism toward IT in centralized banks, along with budget and time overruns, was that project resources did not understand the business unit or product for which projects were delivered, and therefore did not deliver adequate value. This problem was combatted by implementing changes to project management approaches and management information systems.

These developments have culminated in the older four of the Big 5 banks currently having the following project management methodologies and approaches setup:

- Standard Bank follows SAFe, after various revolutionary developments.
- Nedbank follows a traditional approach at the portfolio and programme level, but has range of agile, waterfall, and hybrid project management approaches and methodologies to choose from for the project, after an initial revolutionary centralization and subsequent evolutionary development.
- Absa creates a fully-fledged special purpose agile organization for certain high-priority functions and follows traditional and, increasingly, agile approaches elsewhere in the organization, after revolutionary centralization and further revolutionary and evolutionary developments.
- FirstRand Bank has remained decentralized and followed a 'minimum governance' approach until the late 2010s, but had started to implement DevOps as its approach to IT project management. It remains to be determined to what extent the IT project management function as a whole will maintain its decentralized structure, or be centralized.

The younger member of the Big 5 banks, Capitec, had the luxury of implementing a fully-fledged core banking system at its inception started off using a loosely defined agile project management methodologies and approaches. This bank is now evolving towards

[43] The International Organization for Standardization.

[44] International Business Machines Corporation.

implementing a more well-defined agile project management methodologies and approaches, capable of increasing control and monitoring of project delivery.

It has also been observed that new executive appointees will often initiate significant changes upon taking charge of the IT project delivery function. Speculation regarding the reasons therefore ranges from simply seeking to introduce project management approaches that the executive believes in, to more sinister arguments.

It is also the case that certain senior managers, upon completing a high-priority project or programme, are forced to 'create' new work for themselves within the organization. It seems as if proposing to implement and govern a new project management approach falls within the ambit of such internal vying.

The important implication is that the implementation of changes to the project management approach comes at a resource, financial, and change fatigue cost. Changes to the project management approach are implemented while projects are in-flight, having a negative effect on productivity and on practitioner morale.

A second implication is that, judging by the past, significant changes to the project management approach can most likely be expected for the future. There is no undisputable evidence that recent changes will be significantly more successful, and for a longer period, than previous changes.

2.1.2 Realized versus Proposed Benefits of IT PM methodologies and approaches changes

With regards to the proposed versus realized benefits of project management methodologies and approaches changes there are the obvious time-and-materials expenses to these consulting projects and ongoing costs incurred, such as licensing fees for management information systems and the cost-to-company of the teams created to administer and support the new processes and systems. Factors that are less obvious and harder to estimate and account for, are the emergent costs of such changes. Similarly, whereas obvious benefits, such as predictable processes and single sources of management information are used to justify these improvement initiatives and are easy to point to after the fact, it is much harder to determine if better functionality is delivered more efficiently to the market by the organization's project management function – this challenge is not limited to the environment investigated during this study (S. K. McGrath and Whitty, 2020a).

The reality is that it is that determining the full cost of implementing a significant project management methodologies and approaches change, determining the realized benefits, and then calculating a set of values for the actual improvements and deteriorations would require two or three separate studies and access to information that banks would in all likelihood not be willing to share. From anecdotal evidence, following the posing of the question of costs versus benefits to a wide variety of stakeholders across all of the Big 5 banks, the conclusion is not a desired one. The conclusion is that the answer to the cost

versus benefits question seems to depend heavily on who the question is put to. Those who have to absorb the change are more likely to emphasize the costs and question the benefits. The opposite is true for those who commissioned and approved, or implemented, the changes.

The implication is that changes may be implemented, and continue to be implemented at a net-cost, that this may continue into the future, and that those persons who are expected to absorb the change will not only cite increased change fatigue when future changes are required, but will also will also have reduced trust in the future decision making of senior management.

2.1.3 Dogmatic Support of Preferred PM Methodologies over Others

Regarding the dogmatic support for certain project management approaches and methodologies over others, every project manager and project stakeholder engaged for feedback and comment, had a strong opinion about how IT project management should be approached from a project management methodologies and approaches perspective. Whereas the opinions differed, dogmatic beliefs in the possibility of an ideal project management methodology and approach, and that other project management approaches and methodologies were suboptimal, were ubiquitous. Three of SA's four traditional major banks[45] developed from delivering IT projects in vertically integrated, horizontally decentralized, product-related business units to delivering portfolios of IT projects in large, centralized technology teams.

Decentralized, vertically integrated IT project management delivery was, by nature, a form of Agile; centralized project delivery in all cases were supported initially by traditional, formal approaches to project management, and increasingly by extensive management information systems.

One of SA's four traditional major banks maintained the vertically integrated, horizontally decentralized organization of IT project delivery. The newest member to the group of major SA banks is less than 20 years old and, unlike the traditional major banks, was able to implement a fully-fledged core banking system from inception. The IT project delivery function started off as centralized. Aspects of vertical integration are developing along product- and functionality-lines, and the organisational approach to IT project management was being reviewed prior to the impacts of Covid-19.

Project practitioners from centralized technology teams exhibited the following views:

- Practitioners who spent their early careers in decentralized setups, opined that a return to decentralization would be ideal, although not one stakeholder deemed such

[45] Absa, FNB, Nedbank, and Standard Bank were the traditional major banks; Capitec has been in business for two decades and rapidly gained on the aforementioned four banks by providing banking services to previously 'unbanked' persons.

a return possible or likely. These practitioners held strong views regarding an optimal project management methodology and approach for their present contexts.

- Practitioners who were never significantly exposed to decentralized setups, strongly believed that one, or a hybridization, of the current, formal project management approaches and methodologies held the solutions to the problems experienced in IT project management, specifically as it pertained to the centralized setup.
- Practitioners who received their initial project management experience in the SA military or police service, neither favoured a centralised nor decentralised setup, nor project management methodology and approach; but desired the minimum interference from any entity outside of the most narrowly defined sphere of the project.

Remarkably, without exception, practitioners from the single remaining vertically integrated, horizontally decentralized bank did not desire major change to their organization's approach to IT project delivery. This bank, and its affiliates, have been repeatedly recognized for its innovativeness.[46]

The implication of dogmatic support for a specific project management methodology and approach is that the current project management methodology and approach or implementation of a new project management methodology and approach will likely be poorly supported project stakeholders. Furthermore, dogmatic support for one approach may disable project stakeholders from applying valuable principles from other approaches and effectively hybridizing project management approaches and methodologies.

2.1.4 Conclusion

It is a fact that changes to the IT project management methodology and approach have been implemented frequently across SA's Big 5 banks, it is difficult to determine the success of these changes, and dogmatic preference of certain project management approaches and methodologies over others seem to be prevalent. The implications are that new changes may be expected in the future, that mistakes may be repeated, and that change may be resisted.

These observations are the result of years of experience in a variety of contexts, countless interactions with project managers and project stakeholders, and critical engagement and application of the theory, methods, and practices of IT project management. It is argued at this point that there may be value in further exploring the validity and value of these propositions. In light of human error, these observations must be scrutinized for accuracy, truthfulness, and for the sake of development.

From the observations early problem statements are deduced. The first mini-question of the research is: are the observations real and valuable for research. The first research objective is to answer this question. The next step, in accordance with the Hegel Circle, is taken in

[46] Examples of awards and recognition for innovativeness in banking can viewed here: first example, second example, third example.

the next chapter and involves the questioning of the validity of the observations. This is done so that the soundness of the thesis that is formed from the observations may be assessed and improved.

The observations outlined in this chapter are summarized in Table 2.1.4-1.

Most importantly, the question emerges: can the project management approach situation in this setting be improved?

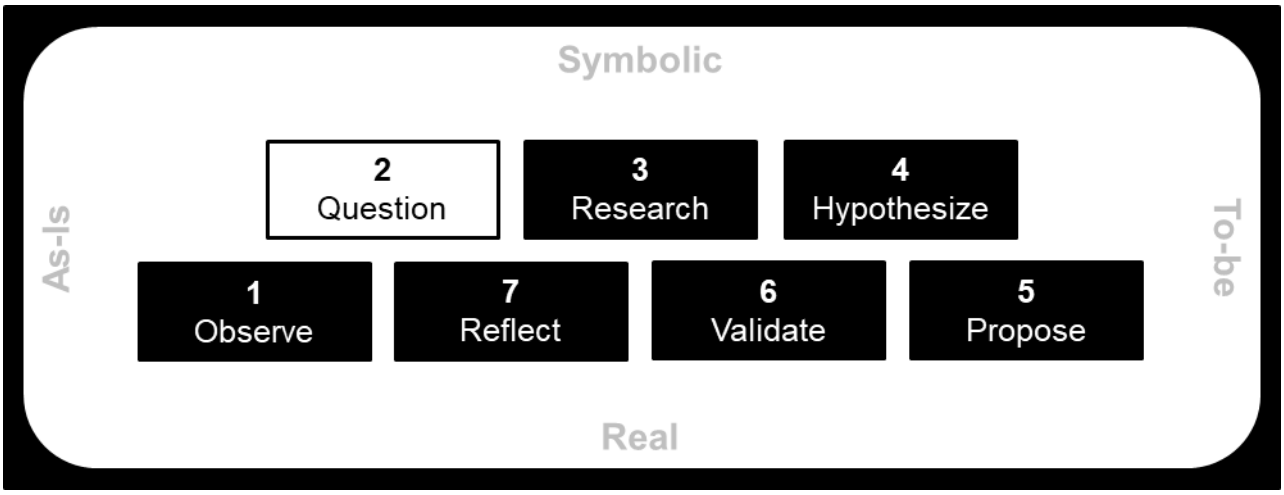
Table 2.1.4-1: Observations from Practice

#	**Observation**	**Next Step**
1	Frequent changes to project management approach.	Assess the relevancy & significance of the observations.
2	Realized versus expected benefits.	
3	Project Management Approach Dogmatism.	

2.2 Question – the Validity of the Observations

"Observations are open to a variety of interpretations."

Isaac Asimov



In order to justify further action based on the initial observations, a threshold of pragmatic truthfulness must be reached. This was done by means of coherence tests of truthfulness and what can be referred to as an indirect correspondence test. This is the second action in the Hegel Circle and affords the opportunity to subject the observations, and the natural, resultant thesis formation following the observations, to scrutiny – the researcher must, at this point, critically assess the observations.

The indirect correspondence test involved discussing the observations with other practitioners. Discussion technically seeks coherence between the observations of different individuals, however, since these observations are tied directly to first-hand experience of the situation in the real world, it could be referred to as a correspondence-once-removed test, or an indirect correspondence test.

2.2.1 Indirect Correspondence Test

The first test of the truthfulness of the observations revolves around asking whether the observations correspond to the facts as found in practice. A direct comparison of the observation to the fact found in practice would be a correspondence test of the truth. Since it is not possible to conduct an exact comparison between the observations and the facts in practice within the scope of the study, the observations of the researcher are rather compared to observations of other persons who were present in practice. Technically this test would therefore constitute a coherence test, but since first-hand accounts are to be compared, the test is rather referred to as an indirect correspondence test. This also allows for a differentiation from the section 2.2, where the observations will be tested against documented accounts.

The indirect correspondence test involved presenting the observations to seven IT project stakeholders who, between them, had direct experience regarding IT projects in four of SA's

five major banks, the SA Reserve bank and smaller banks; and occupied roles ranging from analyst- to director level.

The indirect correspondence test compares the observations of the researcher to the observations of other practitioners of the facts found in practice, the test is called an 'indirect' test of correspondence in this case, since the initial observation is compared to the observations of others who are directly involved with IT projects in practice. All seven stakeholders engaged deemed the initial observations as accurate enough[47] and significant enough to warrant further investigation. It was also confirmed that all of SA's major banks had implemented significant changes to the project management methodology and approach in the last five years, or are in the process of doing so.

The caveat to be added is that the feedback depended heavily on the respondent's positioning towards project management approach changes, as explained in 2.1.2.

The observations relating to the changes implemented to project management approaches have also been specifically captured in reports (Alkema and Yu-Chen, 2016; Jhaveri, 2016; ABSA Group Integrated Report approved by Board the and Directors, 2019; Nedbank Group Ltd, 2019) and specific research (Ntimane, 2020).

The observation relating to the implementation changes to the project management approach can therefore be verified as corresponding to the reality of practice. The observations relating to the project approach dogmatism and the questionable results of project approach changes require further investigation, however. For this purpose, the further test of truthfulness, the Coherence Test, follows.

The development of the assessment of the observations up to this point is summarized in Table 2.2.1-1.

Table 2.2.1-1: Observations Assessment (1)

#	**Observation**	**Relevant**	**Significant**
1	Frequent, impactful changes implemented to project management approach.	Yes	Yes
2	No clarity on whether realised benefits equal expected benefits.	TBC	TBC
3	Project Management Approach Dogmatism.	TBC	TBC

[47] Observations being 'accurate enough to warrant further investigation' is an application of the pragmatic and anti-realist conception of truth. Given the constraints of a research project, undue resources are not be spent at this point, further action is reasonably justified.

2.2.2 Coherence Test

Whereas the indirect correspondence test sought to test the observations against the facts in practice, the coherence test compares the observations to prevalent ideas, conclusions drawn from empirical research and status reports from practice. The observations and feedback garnered during the indirect correspondence indicated the opportunity for valuable research – this had to be tested further.

The observation of project management approach dogmatism was confirmed as truthful for its coverage in formal works (Stadick, 2013; Gregory, 2018; Ralph and Oates, 2018); and publications by professional organizations relating project management methodology and approach and online blogs. It was found that project management approach dogmatism has been a frequent and general topic of discussion over the last decade (Hartman, 2009; Juli, 2011; The Code Curdmudgeon, 2011; Eriksson, 2012; Lucas, 2014; Bracken, 2015; Blasband, 2016; Melchizedek, 2016; Thompson, 2016; AgileUprising, 2017; Bellinson, 2017; Madden, 2017; Buchanan, 2018; Dhall, 2018; Guay, 2018; Nijland, 2018; Nicolette, 2019; Redmond, 2019).

The observation relating to the questionable results achieved following changes implemented to project management approach is more difficult to answer. There are a variety of reasons for this. Studies that report on the success of agile vis-à-vis traditional project management approaches (Khoza and Marnewick, 2020; Gemino, Horner Reich and Serrador, 2021) compare outcomes between organizations, and not situations before and after project management approaches changes within the same organization. Furthermore, these studies analyse project success factors, which identify correlations, but not necessarily causation. And, it remains difficult to determine if increased project success, measured by any factors, translate ultimately to an improved product (S. K. McGrath and Whitty, 2020a).

That having been said, certain inferences can be drawn. Challenges that remain after agile adoptions (Tengstrand, Tomaszewski and Borg, 2021), success factors wherefore agile do not provide gains over traditional approaches (Khoza and Marnewick, 2020), the survival of plan-driven approaches (Marinho *et al.*, 2019), and the growth of hybrid and mixed approaches (Komus, 2020; Gemino, Horner Reich and Serrador, 2021) either point to the failure to achieve the expected benefits from project management approach changes, or to changing needs and expectations[48]. It is, therefore, concluded that the investigation should continue and that no argument to the contrary was identified.

The coherence test of the observations was not only limited to establish the truthfulness of the observations, but also asked questions of importance:

- Is project management methodology and approach an important topic of current project literature, or is it a resolved issue as far as research is concerned?

[48] Further exploration of the performance of project management approaches follows in 2.2.2.1.

- Is there empirical proof for project management methodology and approach being an important element of project success?
- Could the ideal project management methodology and approach provide the ultimate solution to the challenges faced by IT project management?

The eminence of project management approaches as a topic of research was confirmed on account of the PMI's recent[49] call for research relating to hybridization of project management approaches and methodologies (Project Management Institute, 2017) and reports indicating the evolution of project management methodology and approach in practice (Komus, 2014, 2017; Project Management Institute (PMI), 2019; Komus and Kuberg, 2020). This question, referring to the first observation, was asked in order to determine whether the observations were local phenomena that had been solved elsewhere and for which existing solutions merely had to be configured and implemented in the local setting, or alternatively, whether the investigation of observation could be of general value[50]. Furthermore, since project management methodology and approach are evolving, it can be concluded that current trends of implementing changes to the project management methodology and approach in SA banking IT project management will continue in the future.

The impact of project management approaches on project success was confirmed upon review[51] of relatable studies (Zwikael and Ahn, 2011; Joslin and Müller, 2015, 2016b; Takey and Carvalho, 2015; Musawir *et al.*, 2017). This question was assessed after one of the seven project stakeholders engaged in the indirect correspondence test of the observations opined that the impact of project management methodology and approach on project success was highly overestimated. It was important to be convinced of the value of project management methodology and approach before effort would be spent on a study of project management methodology and approach[52].

With regards to the quest for the ideal project management approach: The shortcomings of traditional waterfall methods of project management and the superiority of agile and other new methods are accepted as stylized facts, but empirical evidence does not support a narrative of an ideal project management methodology and approach as a solution to a multitude of problems (Marnewick and Lessing Labuschagne, 2011; Bierwolf, 2016; Lindsjørn *et al.*, 2016a; Vijayasarathy and Butler, 2016a; Recker *et al.*, 2017; Saeed, 2017; Marinho *et al.*, 2019); furthermore, the *No-Silver-Bullet* argument in Software Engineering that has been ongoing and unrefuted since 1987 (Brookes, 1987; Brooks, 2003; Mancl, Fraser and Opdyke, 2007; Fraser and Mancl, 2008, 2018; Galin, 2015). It is argued that this state of affairs can be extended to IT project management – there is likely no silver bullet to the challenges faced in IT project management[53].

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[49] The PMI's call followed the inception of this study.

[50] This conclusion is also supported by literature review as found in 2.2.2.1.

[51] See Appendix A – The Generality of PM Principles for more detailed account relating to this point.

[52] This conclusion is also supported by literature review as found in and 2.2.2.1.

[53] This question is more elaborately answered in 2.3.4.

2.2.2.1 Project Management Methodology Performance in Practice

Review of existing literature revealed that IT success rates have been rising, but that the measured rise was impacted by a change in understanding of project management and project success and did not purely reflect underlying improvement in IT project management (Project Management Institute, 2017).

The success of agile over waterfall approaches has been established empirically (Serrador and Pinto, 2015; Khoza and Marnewick, 2020; Gemino, Horner Reich and Serrador, 2021). Furthermore, the implementation of changes to project management approaches has been reported on (Fitzgerald, Russo and O'Kane, 2003; Karlström and Runeson, 2005; Shenhar *et al.*, 2005). There has also been research resulting in practical guidance, resulting from reviews and by propositions of tailoring criteria and actions (Conboy and Fitzgerald, 2010; McClure, 2019).

Whereas criticisms of waterfall approaches and the virtues of agile, and hybrid increasingly, are accepted as stylized facts, (Saeed, 2017) organizations experience varying levels of success following the adoption of agile project management approaches and methodologies (Bierwolf, 2016); and the success of delivery through agile project management approaches and methodologies depend heavily on the implementation of the entire complement of agile development processes.

It has also been suggested that Agile practices improve software team response effectiveness or efficiency, but not both (Recker *et al.*, 2017). Furthermore, teamwork quality and its effect on team performance is fairly similar between Agile and Traditional teams (Lindsjørn *et al.*, 2016b). Despite claims to the devolution of power to the team, power hierarchies within and around the team may persist and 'self-managing' not reached and that Agile project management methodology and approach being implemented but changing little other than naming conventions (Hodgson and Briand, 2013).

Similarly, even though IT project success rates have been rising, but that the measured rise was impacted by a change in understanding of project management and project success and did not purely reflect underlying improvement in IT project management (Project Management Institute, 2017). Furthermore, it is much harder to determine if better functionality is delivered more efficiently to the market by the organization's project management function.(S. K. McGrath and Whitty, 2020a).

The differences in the success rates of 617 SA software projects according to five criteria groups were analysed in 2020 (Khoza and Marnewick, 2020). These groups were process success, project success (the triple constraint), deliverable success, business success, and strategic success. Whereas agile approaches resulted in clearly improved overall project success, agile approaches only significantly improved the deliverable and strategic success. Aspects of project success (the triple constraint) and business success of agile approaches are proposed as concerns requiring investigation.

2.2.2.2 Project Management Approach Dogmatism

Inter- and intra-methodology dogmatism is among project practitioners has been identified by formal research (Stadick, 2013; Gregory, 2018; Ralph and Oates, 2018), and raised on online blogs and publications by professional organizations relating to project management methodology and approach (Hartman, 2009; Juli, 2011; The Code Curdmudgeon, 2011; Eriksson, 2012; Lucas, 2014; Bracken, 2015; Blasband, 2016; Melchizedek, 2016; Thompson, 2016; AgileUprising, 2017; Bellinson, 2017; Madden, 2017; Buchanan, 2018; Dhall, 2018; Guay, 2018; Nijland, 2018; Nicolette, 2019; Redmond, 2019). It can therefore not be assumed that agreement on a 'best' best-practice exists.

Given the prevailing challenges experienced with agile approaches and disputes regarding project management approaches, the rise of hybrid approaches makes sense. Empirical evidence for the success of hybrid approaches equalling that of agile approaches has established hybrid as a leading project management approach (Gemino, Horner Reich and Serrador, 2021). Hybrid as an increasingly popular choice is supported by various other empirical studies (Komus, 2014, 2017; Vijayasarathy and Butler, 2016b; Marinho *et al.*, 2019; Komus and Kuberg, 2020). The evidence, based on observation and empirical work (Vijayasarathy and Butler, 2016a; Komus, 2017; Project Management Institute, 2017; Marinho *et al.*, 2019; Project Management Institute (PMI), 2019; Komus and Kuberg, 2020) suggest that hybridized approaches to project management are increasingly the most common approaches to project management that are practiced.

The question of the research then develops: Why does neither agile nor waterfall approaches achieve holistic success in practice? And, what are the theoretical underpinnings required to formalize and holistically improve hybrid over both agile and waterfall approaches?

In light of the literature reviewed, it is concluded that project management methodology and approach is worthy of investigation through formal research and that valuable opportunities for research exists with regards to the Multi-Methodology System.

2.2.3 Conclusions & Questions Regarding the Observations

The observations, following the correspondence and coherence tests, are believed to be adequately accurate. The resultant thesis is that IT project management approaches and methodologies in SA banking present topical, and important research items to project practice, methods, and literature.

In the context of the growing adoption of hybridized and mixed-method project management methodology and approach (Komus, 2014, 2017; Vijayasarathy and Butler, 2016a; Project Management Institute, 2017; Project Management Institute (PMI), 2019; Komus and Kuberg, 2020) and the enduring challenges to project management methodology and approach, the following questions arise naturally:

- Is there a shared fundamental flaw to the current set of formal project management approaches and methodologies and thinking about project management methodology and approach?
- How can project management methodology and approach be improved for IT project management in SA banking?

Table 2.2.3-1: Observations Assessment (3)

#	**Observation**	**Relevant**	**Significant**	**Note**
1	Frequent changes implemented to project management approach.	Yes	Yes	NA
2	Realized versus expected benefits.	Yes	Yes	The available research on the subject allows for inference.
3	Project Management Approach Dogmatism.	Yes	Yes	

In terms of the Hegel Circle, the second step has been completed – the questioning of the observations first by testing for correspondence and then by testing for coherence. The testing of coherence occurred by reviewing literature in order to answer questions that relate to the observations. As listed in Table 2.2.3-1, it is argued that the observations had baring in reality, and that they may constitute a valuable research opportunity. Now greater background research into the state of project management approach and methodology research would be required in order to address these conclusions and questions.

These issues identified during the questioning are traced to the relevant observations (Table 2.2.3-2) so that traceability may be maintained. It also explains how the questions answered in this section relate to the initial observations, and how the narrative and direction of the study developed.

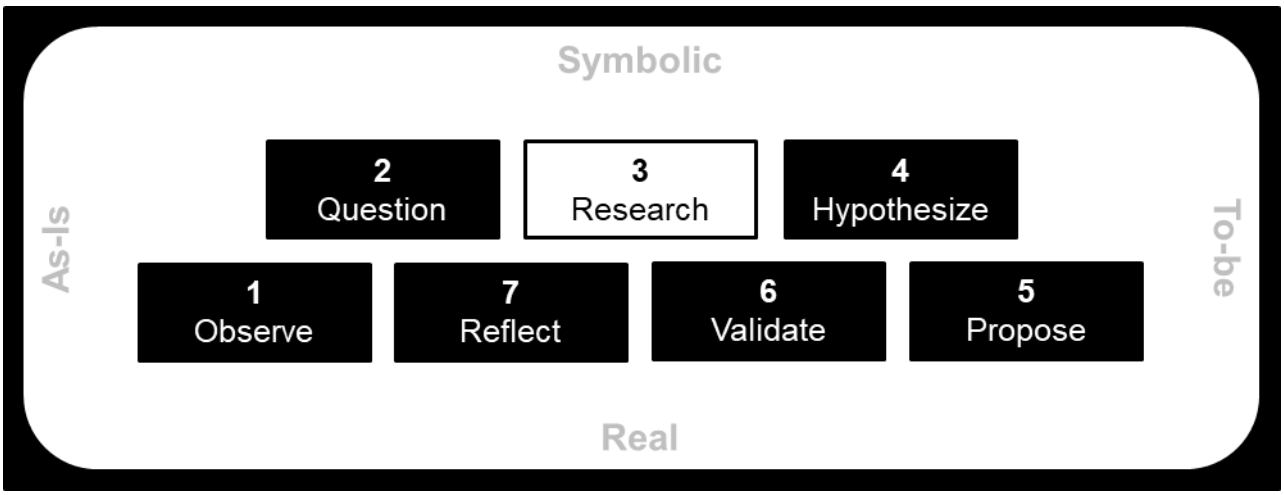
Table 2.2.3-2: Gaps, Issues & Directions for Research (1)

#	**Gap/Direction**	**Observation**
1	Success factors where Agile does not outperform Traditional. (Khoza and Marnewick, 2020; Gemino, Horner Reich and Serrador, 2021)	2
2	Project management approach success before and after change within firms. This is a gap that has not been well-described in literature.	1, 2
3	Antidote to project management approach dogmatism. (Juli, 2011; Eriksson, 2012; Lucas, 2014; Blasband, 2016; Melchizedek, 2016; Dhall, 2018; Ralph and Oates, 2018; Hillbrand, 2019; Nicolette, 2019)	3
4	The empirical work causes the demand for theoretical work to explain the empirical findings. (Winter and Smith, 2006)	2, 3

2.3 Research – the State of the Field & Critical Reviews

"It is undesirable to believe a proposition when there is no ground whatever for supposing it true."

Bertrand Russell



In the previous chapter the observations were scrutinized and found to be representative of current and important topics in project and project management research. In this chapter deeper background research is done into project management methodology and approach literature as outlined in the 'objectives' listed above.

In terms of the Hegel Circle, this research is part of the development of the thesis of the real-world situation, as it is. The case has been made for the accuracy of the observations and the thesis that IT project management approaches and methodologies present a valuable research opportunity. During the execution of this step in the Hegel Circle explanations as to root cuases of deficiencies and possible approaches to improving the current situation are sought.

2.3.1 The Development of PM Approaches & Methodologies in Literature

During the early 2000s, at Motorola's software development facility in Cork, Ireland, industry-level standards that would suit the organisation were selected first (Fitzgerald, Russo and O'Kane, 2003). It was decided that IEEE 1074 adequately described high-level processes, this was infused with the specific activities, sequences and artefacts described by the V-Model. Where the method was still lacking, additions were made to the process. This provided a project management methodology and approach that was suitable to the business unit and left room for the project to fine-tune the process to its specific requirements, including retailoring when re-planning the project. Furthermore, the project management methodology and approach is not static, but allows for future enhancements.

The important takeaway is that two methodologies that played to different strengths were hybridized.

Another study during the early 2000s, showed NASA[54] classifying projects according to the domain within which they take place (Science, or Exploration, or Space Operations), since resources and processes are also divided along these domains. The authors of the report proposed four characteristics (Complexity, Novelty, Pace and Technology-level) to be used to classify the project types within the domains (Shenhar *et al.*, 2005). A technology readiness level then needs to be applied in order to further estimate the associated risks. The technology readiness levels are attained during the course of the project. This technology readiness levels exists apart from the four-prong technology risk level which makes up a part of the four-dimensional project classification model. The takeaway is a four-dimensional project classification model and a nine-level technology readiness framework that can be built upon and reused. Creating a NASA-specific project management framework, building on this work was proposed as future research.

Towards the middle 2000s, a study covering more than 20 software development firms showed that the majority of organizations adopted agile principles within a traditional, stage-gate process to varying degrees (Karlström and Runeson, 2005). Many oft-touted agile benefits were confirmed to be achievable and, indeed, agile in general and Extreme Programming (XP) in particular can be integrated with stage-gate project management. Pitfalls to plan for and pre-emptively act on to mitigate expected risks to were identified. Qualitative benefits were described that were both rationally justifiable and sellable benefits. Improving stakeholder education and ensuring management buy-in before the change hits the shore was proposed as areas for future work, which is an important takeaway for this study.

Towards the end of the 2000s the current state and effectiveness of XP tailoring was assessed through expert interviews (Conboy and Fitzgerald, 2010). An outcome was a framework comprised of two sets of factors (method particularities and programmer practices) that aims to enhance tailoring, including best practices and assistance in its application to tailoring. This article describes actual methods utilised in the workplace and best practices that can be applied, this is an entire guide to tailoring, unfortunately limited to XP. The outcome of this work is, however, are not readily applicable to the tailoring of other methodologies. Nineteen topics for future research and recommendations to software teams are proposed. An important observation is that the limitations of XP should be researched and alternative methodologies for unique requirements should be sought.

Searches for empirical analysis of the shortcomings of different Agile methodologies have been largely fruitless, the vast majority of literature on the topic being pro-agile in nature. Specifically, a framework for method comparison is listed as a gap in the literature.

The preceding paragraphs touched on instances of successful tailoring and hybridization up to 2010, furthermore a set of 49 tailoring criteria and a list of 20 tailoring actions, along with

[54] National Aeronautics and Space Administration.

a useful literature review on the subject matter, is delivered by 2010 (Kalus and Kuhrmann, 2013) (Conboy and Fitzgerald, 2010).

During the early 2010s a Model Driven Engineering approach to tailoring was described (Hurtado Alegría *et al.*, 2011). The authors produced a process model that allows for variability at certain predefined points leading to a project-adapted process model; or tailoring by model transformation. This provides a formalization and systemization of tailoring steps that every software project should follow, so that the tailoring process can be standardized.

Also during the early 2010s, scale agile methodologies and the determination of organisational complexity were utilized in order to select a base methodology and a secondary methodology from which characteristics will be added to the base (Nortier, Von Leipzig and Schutte, 2011). In doing so an organisational project management methodology is produced. From there a Software Development Framework is delivered that draws on the strong suites of both the Rational Unified Process and Scrum approaches to project management. This paper gave, possibly as an unintended externality, a good insight as to how a complex sub-project could be approached by managing the sub-project using Rational Unified Process and the individual parts of work of which the sub-project consists, using Scrum.

Approaching the middle 2010s, the argument for the need to combine project management approaches seemed to gain momentum. One reviewed paper provided a thorough literature review concerning project approaches and high-level project characteristics that suite traditional or agile methodologies and called for per-project hybridization of project management approaches and methodologies to be the developed in the future (Špundak, 2014).

Also during the early 2010s, a reference framework of situational factors that inform the software process was developed (Clarke and Connor, 2012). These situational factors consist of eight classifications and 44 factors. Also included, is 170 sub-factors, all of which are described and applicable to the considerations faced in practice. This reference framework is important to improvement actions levelled against the Software Development process. It adds value since the improvement initiative seeks to produce the optimal process for the organisation. Furthermore, it is important to be able to profile the setting, which is exactly what the reference framework enables. This reference framework will be a crucial input to the selection, tailoring and hybridisation process that this study intends to produce.

Despite this research on the tailoring of project management methodologies in practice, this remains an understudied field. refers to the A common discrepancy remains between reporting on ‘what’ was done, but failing to explain ‘how’ it was done (Laufer *et al.*, 2015). A call for research on methodology tailoring and hybridization in practice was raised in 2017 by the PMI (Project Management Institute, 2017). Subsequent issues of the Project Management Journal, the PMI’s journal, did not contain significant works relating to tailoring and hybridization. A related review did not cite a single work from the Project Management Journal post the 2017 call for research (McClure, 2019), and method tailoring and hybridization remain under investigated in general.

It is, therefore, concluded that research into the theoretical underpinnings of project management approaches also need to make provision for tailoring and hybridization concerns.

The key findings following from this assessment of project management methodology and approach research are, in summary:

- Empirical practice-sourced examples of selection, tailoring and hybridization of methodologies
  - Some outputs were produced which could be developed into generalizable knowledge.
  - Situational factors affecting the software development process were identified as examples to follow when studying project management approaches and methodologies.
- The prevalence of such studies, and the potential for the application elsewhere of the outputs of these studies, were lower than expected.
  - No readily implementable tool or method for the tailoring of project management approaches and methodologies were identified.
  - A configuration tool was investigated and referenced as an example for a configuring tool for project management approaches and methodologies.
- The theory-practice gap is evident in the disconnect between research output and professional sources on the one hand, and directly usable material on the other.

A natural maturation, or evolution, is evident in project management methodology and approach literature: publications regarding hybridization and tailoring with regards to are sparse, but literature on the subject is developing. In chronological order literature has been produced on the selection of an adequate project management methodology and approach, the tailoring of the project management methodology and approach, and the hybridizations of project management approaches and methodologies. Proceeding from successfully creating a hybridized project management methodology for an organization, or for a portfolio of projects, a challenge for future research is raised: to customize a unique, hybridized project management methodology for the individual project (Špundak, 2014).

The drawing of the conclusion of this review begged a further question: what exists in the way of generalizable, applicable research pertaining to the implementation of process improvements to IT project management methodology and approach?

The development of project management methodology research in SA most formally focussed on project governance, taking particular shape and direction with (Bekker and Steyn, 2008; Marnewick and Les Labuschagne, 2011); and culminating in broader success factor analysis with specific reference to (Khoza and Marnewick, 2020).

Table 2.3.1-1 summarizes the gaps, issues, and directives identified through literature review. The gap, issue, or directive is listed and in the next column the observation to which the it can be tied is listed.

Table 2.3.1-1: Gaps, Issues, Directives Identified in Literature (2)

#	**Gap/Issue/Directive**	**Obs.**	**Note**
1	Success factors where Agile does not outperform Traditional. (Khoza and Marnewick, 2020; Gemino, Horner Reich and Serrador, 2021)	2	Carried over from section 2.2.3.
2	Project management approach success before and after change within firms. This is a gap and has not been well described in literature.	1, 2	
3	Antidote to project management approach dogmatism. (Juli, 2011; Eriksson, 2012; Lucas, 2014; Blasband, 2016; Melchizedek, 2016; Dhall, 2018; Ralph and Oates, 2018; Hillbrand, 2019; Nicolette, 2019)	3	
4	The empirical work causes the demand for theoretical work to explain the empirical findings. (Winter and Smith, 2006)	2, 3	
5	A next step for the development of project management approach is the tailoring/hybridization of project-specific approaches. (Špundak, 2014)	NA	NA
6	Research & literature relating to the practical aspects of tailoring & hybridization is required. (Project Management Institute, 2017)	1, 2	NA
7	PMI's call for tailoring & hybridization research was not adequately answered. (McClure, 2019)	2	NA
8	Tool, reference guide for the comparison of project management approaches as input to tailoring & hybridization was not found. This is a gap.	2, 3	NA

2.3.2 Concept Proposal: A Multi-Methodology System for IT PM in SA Banking

During the explanation of the Hegel Circle as a research approach (chapter 1.3), and throughout, it has been maintained that whereas a name is given, and disparate approaches are amalgamated, it is not novel as far as methods are concerned. One of the most important principles being emphasised during the execution of the research while seeking to produce the application of this Hegel Circle research approach, is the periodic scrutiny of those observations and conclusions which are readily made, easily obscured from dispute, and often not adequately accurate.

For this reason, the initial observations, even though accepted as cold, hard fact by the observer, were scrutinised; as was the interpretation of these observations. The observations, conclusions, and resultant propositions were invariably presented to practitioners and peers for the purpose of validation.

To be able to decide before the commencement of a research project on the research approach, methodologies, and validation of results should be an immense luxury. To the authoring researcher, however, hopefully herewith embarking on a career in research, such luxuries were not available. The Hegel Circle was employed as a test mule is in automotive product development. Much of the effort during the project was spent on carving out a workable approach *en via*, and afterwards significant reflexivity was employed in interpreting the processes that played out, and seeking to formalise and document it (Mortari, 2015).

If a name had to be given to the validation practiced during this study, the validation could be termed Fuzzy Delphalsification. There are Delphi aspects to the validation, since observations, conclusions, and propositions were discussed throughout, and iteratively, with practitioners and peers.

At best the validation can be referred to as a *fuzzy* application of Delphi aspects, since many of the interactions with experts were not formalised, and the interactions were not planned and executed explicitly as Delphi validations. Furthermore, working towards consensus is necessary in practice, but suboptimal during research. The *falsification* part of the Fuzzy *Delphalsification* has to do with the attempt to bring falsification into the process. Expert practitioners and peers were requested to critique, to identify the gaps in the logic of the conclusions and propositions.

The attempt at building falsification into the process was not ultimately successful, since the presentation of the observations, conclusions, and propositions were inevitably defended by the presenter, and the questionnaires prompted affirmative feedback whereas it should have explicitly encouraged dissent.

That having been said, feedback from expert practitioners and peers were obtained throughout the process and utilised. After conducting the initial background research, the early propositions, and the rationale and process that lead to the formation of the propositions, were presented at two industrial engineering conferences (Steyn de Wet,

Schutte and van Dyk, 2018) in order to obtain feedback regarding the validity of the propositions and the potential value for formal research.

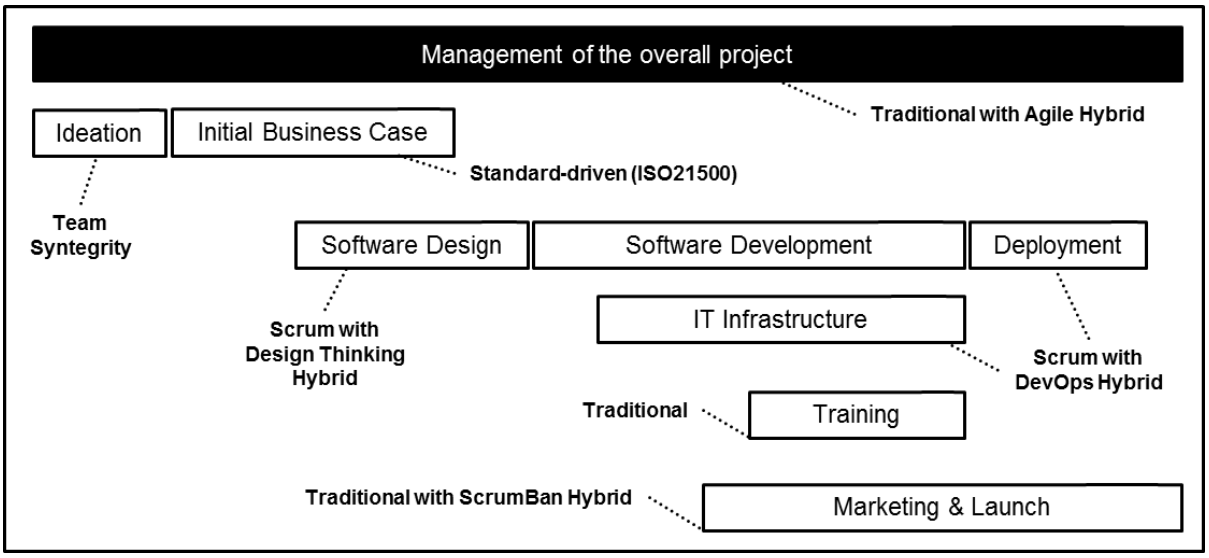


Figure 2.3.2-1: Multi-Methodology View

The presentations at the conferences can be summarized as follows:

- An average IT project in SA banking may be complex in the sense that it must preside over the integrated delivery of multiple, and disparate streams of work, as illustrated in Figure 2.3.2-1.
- Therefore, it was proposed that multiple methodologies are required for the components, or streams, of the complex project.
- An early version of the Multi-Methodology System was presented as a proposition.
- In order to enable the utilization of multiple methodologies, a methodology comparison tool was also proposed which would enable the comparison of project management methodologies for mutually inclusive and exclusive characteristics.

In terms of a hypothesis being stated and tested: the hypothesis was that the Multi-Methodology System was needed for the practice of IT project management in SA banking (and by implication that it was a sensible proposition); and that it could be expected to be useful to the tailoring and hybridization of project management methodologies.

Delegates who attended these sessions were requested to provide feedback by means of asking questions of clarifications, raising objections, and by filling out questionnaires. The results are illustrated in Figure 2.3.2-2. The purpose of the presentation was to determine if respondents saw the Multi-Methodology System as an addition that is needed in the practice of project management, and if it was expected to be useful to the tailoring and hybridization of project management methodologies. The questionnaire posed these questions and prompted a Likert scale (agree, indifferent, or disagree) response.

Eight delegates who attended the 2018 South African Institute of Industrial Engineering (SAIIE) conference's project management session completed questionnaires; 25 for the Industrial Engineering and Operations Management (IEOM) Society 2018 conference's

project management session; and seventeen for the IEOM Society 2018 conference's IT session. Duplicate responses were removed from the feedback, with only the earliest questionnaire used.

The questionnaire also requested feedback from respondents with regards to their project management experience and project management related education and qualifications. Figure 2.3.2-2 contains the feedback from the three sessions at the two conferences. A first filter is applied to the feedback to select for respondents who had some project management education or qualification and were actively involved in project management. When the sample is filtered for respondents who have project management background, the understanding of the Multi-Methodology System increases, as does the assumed need for it, and its expected usefulness to tailoring and hybridization.

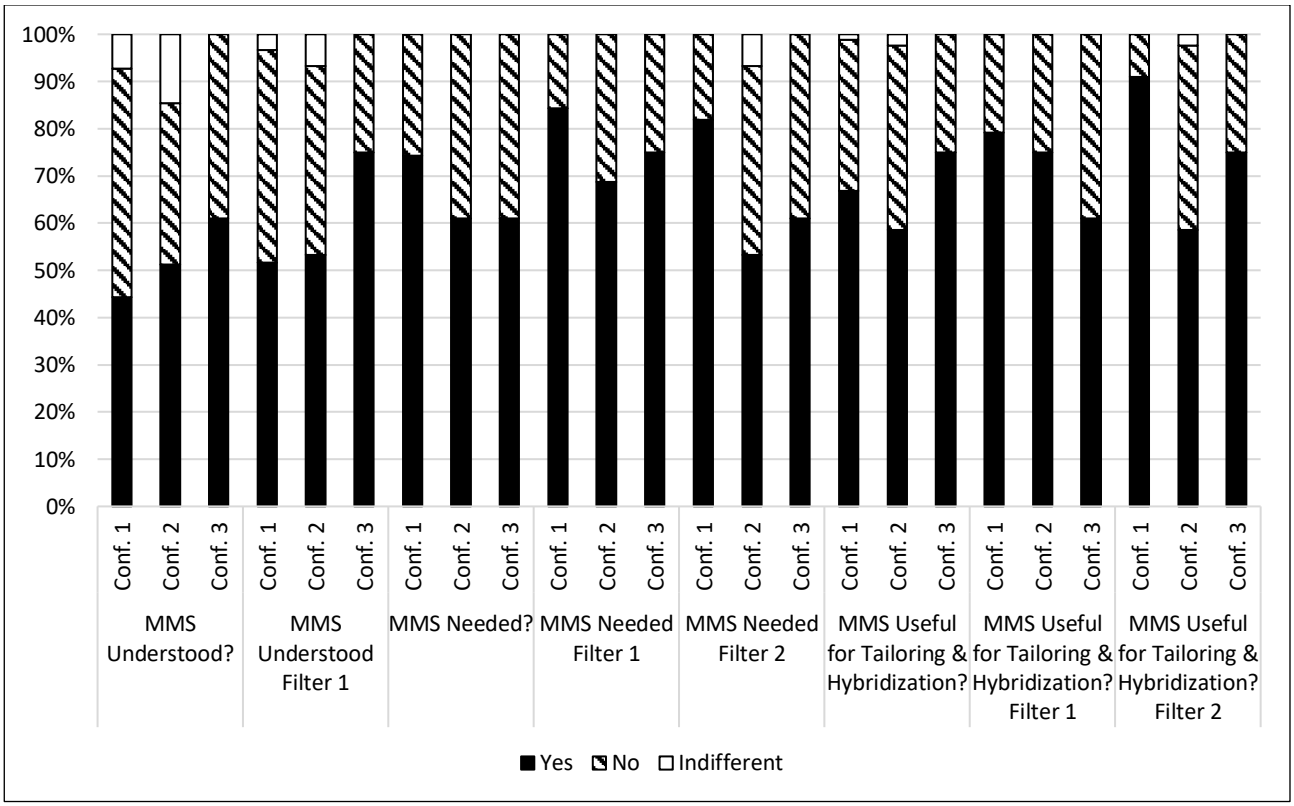


Figure 2.3.2-2: Feedback on Hypothesis from Engineering Conferences

A second filter is applied to select for respondents who claimed to have understood the Multi-Methodology System as presented. Respondents may inaccurately have claimed to understand the presentation, which would not improve feedback results, but at least feedback from respondents who knew that they did not understand the presentation could be filtered out. It is therefore argued that the two filters improve feedback quality. The estimated need and usefulness of the Multi-Methodology System increases with application of each filter.

Regarding the need of a Multi-Methodology System and its usefulness for tailoring hybrid project management methodology and approach, the feedback was overwhelmingly positive. Less than half of the respondents claimed to have understood the propositions and therefore the first filter was applied. Understanding of the hypothesis increases slightly

following the filter, as does positivity with regards to the other questions. Positive or negative feedback from respondents who did not claim to understand the hypothesis can be questioned and therefore the second filter was applied. The results remain overwhelmingly in favour of the need for a Multi-Methodology System and the expectation that it could positively contribute to the tailoring of hybrid project management methodology and approach, thus validating the initial propositions, in support of the hypotheses.

Most importantly, the claims of the proposition were not rejected by a significant proportion of respondents – rejective responses are close to zero after the application of the filters.

The most common criticisms included:

- The majority of responding delegates would prefer to see how such propositions worked in practice over judging a conceptual presentation.
- Some of the responding delegates was unsure of the unique value add of the Multi-Methodology System over existing approaches to project- and programme management.

2.3.3 Literature on Successful Implementations of Process Improvements in IT

It has been argued that although many solutions to various IT project management challenges are offered, still very little is offered with regards to the implementation of these solutions (Laufer *et al.*, 2015). For this reason, this study also needs to be expanded to provide usable knowledge that pertains to the implementation of the propositions of this study. For this reason, case studies of ITIL[55] implementations were researched for implementation-specific knowledge.

Effective stakeholder engagement, support from senior management and the communication of results and benefits of the improvement project are frequently cited as a Critical Success Factor (Tan and Peng, 2003; Pollard and Cater-Steel, 2009; Tan, Cater-Steel and Toleman, 2009; Iden and Langeland, 2010). Effective project governance and execution processes are noted as further contributing to the implementation's success (Tan, Cater-Steel and Toleman, 2009). Along with the abovementioned interdepartmental communication and collaboration, the use of consultants, training and careful software selection are raised as a Critical Success Factor (Pollard and Cater-Steel, 2009). The same study adds three new Critical Success Factors: creating an ITIL friendly culture, process as a priority and customer focussed metrics. Prioritised lists by employing the Delphi technique, by which Critical Success Factors are ranked, are proposed (Iden and Langeland, 2010). According to the ranking employed in the referenced study, the three Critical Success Factors mentioned first (effective stakeholder engagement, support from senior management and the communication of results and benefits of the improvement

[55] Information Technology Infrastructure Library.

project as crucial success factors) rank high, whereas technology and, surprisingly, methodology rank low.

The method of prioritised lists by employing the Delphi technique, by which Critical Success Factors are ranked, can be applied in order to kick-off early communication with the affected community, to understand and prioritise Critical Success Factors according to the majority's position and to effectively plan change management (Iden and Langeland, 2010). It provides an opportunity to involve stakeholders from an early stage, aid support of the project and to maintain stakeholders' participation. This also speaks to the Critical Success Factor detailing the importance of creating a culture that will welcome the impending changes (Pollard and Cater-Steel, 2009).

It has been suggested that the 'big bang' implementation approach is more suitable to smaller companies that faced shorter implementation times and for initial setups (Pollard and Cater-Steel, 2009). In larger organisations, the 'big bang' approach is challenging for reasons including resistance to change, ongoing business processes and the collective mind set required to adapt to a new process. In the case of large organizations, a staggered approach would carry less risk. This would also make sense in the project world. Existing projects could be completed using the existing project management methodology and approach, only adopting elements from the improved process that the project team chose out of free will, and new projects can follow the improved process, which also decreases the stress on the support functions within the Project Management Office that would need to aid these new projects. The risk does then exist that some project team members would face a dual role dilemma in the transition period. Finally, the exploitation of quick wins is stressed as a way in which to win the early buy-in from affected stakeholders.

In summary:

- Critical success factors that improve implementations had been developed through multiple studies of ITIL implementations.
- The elaboration and refinement of Critical Success Factors over the last decade had been described.
- The challenges and benefits of the staggered versus big bang approaches to change implementation had been assessed.

Table 2.3.3-1 summarizes the gaps, issues, and directives and trace these to the observations, similar to Table 2.3.1-1. This tabled summarization and tracing continues throughout the document.

Table 2.3.3-1: Gaps/Issues, directives Identified from Literature (3)

#	**Gap/Issue/Directive**	**Obs.**	**Note**
1	Success factors where Agile does not outperform Traditional. (Khoza and Marnewick, 2020; Gemino, Horner Reich and Serrador, 2021)	2	Carried over from section 2.2.3.
2	Project management approach success before and after change within firms. This is a gap and has not been well-described in literature.	1, 2	
3	Antidote to project management approach dogmatism. (Juli, 2011; Eriksson, 2012; Lucas, 2014; Blasband, 2016; Melchizedek, 2016; Dhall, 2018; Ralph and Oates, 2018; Hillbrand, 2019; Nicolette, 2019)	3	
4	The empirical work causes the demand for theoretical work to explain the empirical findings. (Winter and Smith, 2006)	2, 3	
5	A next step for the development of project management approach is the tailoring/hybridization of project-specific approaches. (Špundak, 2014)	NA	Carried over from section 2.3.1.
6	Research & literature relating to the practical aspects of tailoring & hybridization is required. (Project Management Institute, 2017)	1, 2	
7	PMI's call for tailoring & hybridization research was not adequately answered. (McClure, 2019)	2	
8	Tool, reference guide for the comparison of project management approaches as input to tailoring & hybridization was not found. This is a gap.	2, 3	NA
9	Work relating to critical success factors for ITIL implementation can be built on for implementations of changes to the project management approach. (Pollard and Cater-Steel, 2009; Tan, Cater-Steel and Toleman, 2009)	2	NA

2.3.4 Complexity of IT PM SA banking

A high-level description of the complexity of IT project management in a setting like SA banking is offered[56].

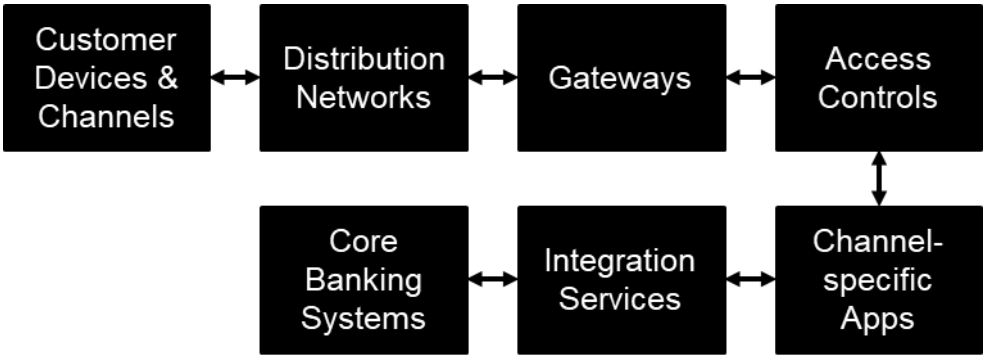


Figure 2.3.4-1: Component Groups of Banking Architecture

The IT infrastructure of a bank typically consist of more than a hundred significant components, with significant interconnectedness and variation between legacy systems and newer systems[57] (Kooijmans *et al.*, 2012) (Pavlovski, 2013) (Kilimnik and Pavlovski, 2014). An IT project may require changes to be deployed in multiple components in each component group (Figure 2.3.4-1), delivered by multiple development teams.

There exist great variations between the component groups, like the communication protocols between applications, gateways, and databases built using different programming languages. These differences can be as complex, and even more so, within component groups where a core banking system coded in COBOL (yes, many banks still run mainframe) communicates to a treasury system built using ABAP[58].

An overview of the complexity of IT project management in SA banking as it relates to small changes having big impacts, the types of work included under the umbrella of IT project management, and the complexity of the systems landscape can be viewed in the introduction chapter (section 1.1.1) and in Appendix B – SA Banking for IT PM Research.

The technical challenges may be complicated, but the least complex in a sense. What makes IT project in SA banking particularly complex is that the IT project management often includes the project management of the greater initiative, including 3rd party, business, and regulatory aspects. This is illustrated in Figure 2.3.4-2.

The argument, which is being developed in this section, is therefore that a single, predetermined approach is not likely to be adequate for the management of such complex projects.

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[56] See Appendix B (page 203) for a more detailed account.

[57] Studies from 2012, 2013, and 2014 provide detailed descriptions.

[58] Advanced business application programming.

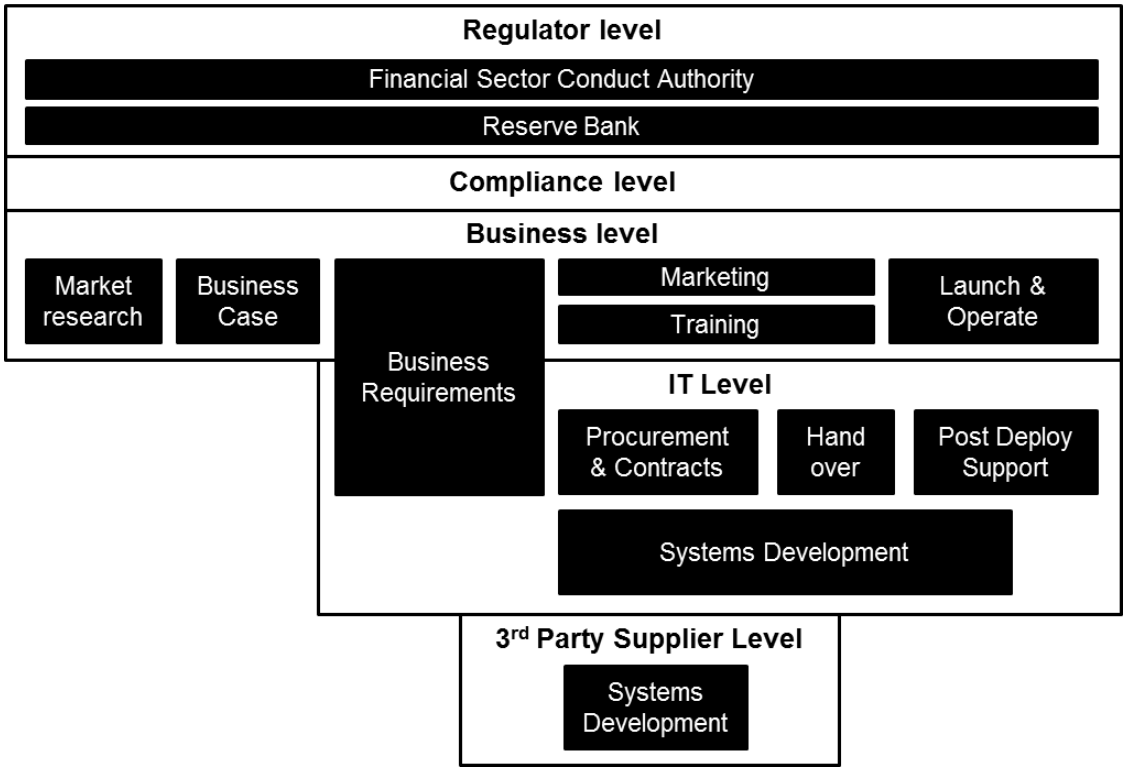


Figure 2.3.4-2: An example of the components of an IT project in SA banking

This section added some contextual background and is captured in row 11 in

Table 2.3.4-1.

Table 2.3.4-1: Gaps/Issues, Directives Identified from Literature (4)

#	**Gap/Issue/Directive**	**Obs.**	**Note**
1	Success factors where Agile does not outperform Traditional. (Khoza and Marnewick, 2020; Gemino, Horner Reich and Serrador, 2021)	2	Carried over from section 2.2.3.
2	Project management approach success before and after change within firms. This is a gap that is not well-described in the literature.	1, 2	
3	Antidote to project management approach dogmatism. (Juli, 2011; Eriksson, 2012; Lucas, 2014; Blasband, 2016; Melchizedek, 2016; Dhall, 2018; Ralph and Oates, 2018; Hillbrand, 2019; Nicolette, 2019)	3	
4	The empirical work causes the demand for theoretical work to explain the empirical findings. (Winter and Smith, 2006)	2, 3	
5	A next step for the development of project management approach is the tailoring/hybridization of project-specific approaches. (Špundak, 2014)	NA	Carried over from section 2.3.1.
6	Research & literature relating to the practical aspects of tailoring & hybridization is required. (Project Management Institute, 2017)	1, 2	
7	PMI's call for tailoring & hybridization research was not adequately answered. (McClure, 2019)	2	
8	Tool, reference guide for the comparison of project management approaches as input to tailoring & hybridization was not found. This is a gap.	2, 3	
9	Work relating to critical success factors for ITIL implementation can be built on for implementations of changes to the project management approach. (Pollard and Cater-Steel, 2009; Tan, Cater-Steel and Toleman, 2009)	2	Carried over from section 2.3.3.
10	IT project management in SA banking can be highly complex, nuanced approach is required. Argument formed from direct involvement and own research.	1, 2	Carried over from section 2.3.4.

2.3.5 A Systems-Thinking Criticism of PM Methodologies in Practice.

The early development of project management drew heavily on Systems-Thinking as was found in systems techniques, such as cybernetics, systems engineering and systems analysis; and as practiced in aerospace, construction, and engineering (Pollack and Algeo, 2015a, 2015b; Gordon and Pollack, 2018).

Following this early development, project management has typically focused on systemically quantifying and controlling projects constraints (Pollack and Algeo, 2015a) and aspects of project management, such as risk management (Stewart and Fortune, 1995). The result of this early development can also be seen in the typical top-down management style of the project-delivering organization (Gordon and Pollack, 2018).

There have been calls, throughout the nineties, to introduce more Soft Systems Methodology influences into project management (Yeo, 1993a; Rwelamila and Hall, 1995; Stewart and Fortune, 1995; Jackson, 2001) and the publication of the Agile Manifesto in 2001 (Beck *et al.*, 2001) may be seen as a culmination of this drive and works have been published describing the ways of applying SSMs and the effects of doing so (Costello *et al.*, 2002; Remington and Pollack, 2010; Kapsali, 2011b; Sheffield, Sankaran and Haslett, 2012; Vidal and Marle, 2012; Clegg *et al.*, 2017).

With regards to Multi-Methodology System, examples have been provided of developing an Multi-Methodology System from SSM and Technology Management, of which elements are applicable to IT project management in SA banking. (Small and Wainwright, 2014, 2018) and good overviews (Jackson, 2001; Small and Wainwright, 2014) have been published from the origin of Multi-Methodology System up to the present day. Systemic ways of decomposing methodologies to identify detachable elements, which can be built upon have been published on (Mingers and Brocklesby, 1997); and the combination of various systems thinking tools to form an Multi-Methodology System project management methodology and approach has been proposed too (Sheffield, Sankaran and Haslett, 2012).

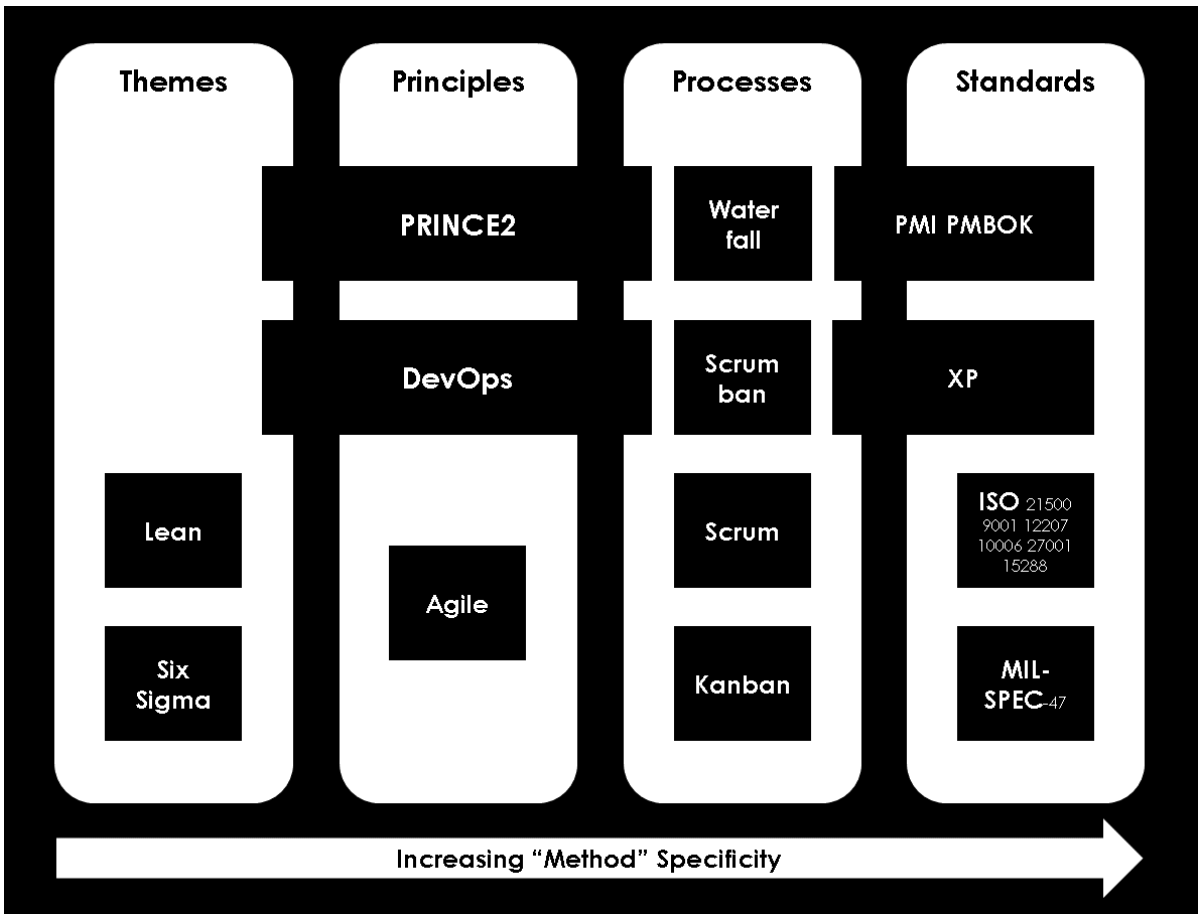


Figure 2.3.5-1: PM Themes, Principles, Processes & Standards[59]*, Adapted* (Aston, 2021)

There is neither a lack of theory nor reports of application of hard and soft systems methodologies to project management. Furthermore, there are many different project management approaches and methodologies to choose from. Yet, Brookes' (Brookes, 1987) statement in 1987, of there being no silver bullet to the challenges faced in SW engineering, and to IT project management by extension, has been backed up by empirical findings (Hodgson and Briand, 2013; Bierwolf, 2016; Lindsjørn *et al.*, 2016b; Vijayasarathy and Butler, 2016a; Project Management Institute, 2017; Recker *et al.*, 2017; Saeed, 2017; Project Management Institute (PMI), 2019; Komus, 2020). With regards to the reports on the application of Systems Thinking approaches to project management, a general critique is that these attempts invariably lead to a predefined 'solution', instead of an adaptable, living system of project management.

Organizations either need to be able to adhere to the full set of requirements of a project management methodology, or have flexibility in methodological approach to projects – otherwise project managers and other stakeholders will necessarily attempt to sidestep the process in order to get the job done (Marnewick and Les Labuschagne, 2011). When the process is not adhered to, risks are incurred. Furthermore, when the process is wilfully

[59] This image was adapted from an image first encountered on the DPM website and can be viewed here. Please note that this website had been offline before upon attempting to visit.

sidestepped, there is an increased probability that the resulting risks will be under-identified and under-reported.

Perhaps the problem could be that organizations still seek silver bullets to IT project management challenges. But, even when the silver bullet is a hybridized project management methodology and approach, tailor-made for the organization, and even if there are a set of three or five or so of these custom-designed project management approaches and methodologies from which a best-fit project management methodology and approach could be selected and tailored for the project. The problem is that the largely pre-defined project management methodology and approach is necessarily a top-down introduced set of requirements and capabilities, around which the delivery of work needs to be organized.

The predefined project management methodology and approach violates Ashby's law of requisite variety (Ashby, 1956), since the predefined project management methodology and approach can necessarily not present practices, techniques, procedures and rules to deal with any emergent challenge that may be put to it, while still having a system that would also be lean enough for efficient use.

It follows that a single methodology, even when fully adopted, would rarely enable the project management function to have the requisite variety of responses ready for all the questions that a complex project, in a complex environment, could ask of a project management methodology and approach system (Vijayasarathy and Butler, 2016a).

Figure 2.3.5-1 is taken from thedigitalprojectmanager.com (Aston, 2019) and adapted. While this picture is not accepted as settled fact, it provides a useful perspective. The approaches listed in Figure 2.3.5-1 differ in essence and utility. No single approach or Hybrid could be used, predetermined, to produce a project management methodology and approach or set of project management approaches and methodologies that would have the requisite variety to absorb the complexity presented by a large, complex portfolio of projects. Rather, the organization should retain the freedom to choose the necessary project management characteristics presented by the different approaches, as required by the project, the teams, and the organization, as is already identified in practice (Vijayasarathy and Butler, 2016a).

Systems thinking theories that aim to deal with requisite variety, that has been applied to project management and reported on, include the VSM (Murad and Cavana, 2012; Regaliza, 2014, 2015; Kummamuru and Hussaini, 2015; Puche Regaliza, Jiménez and Val, 2017; Bathallath, Smedberg and Kjellin, 2019), Systems of Systems (Karayaz, Keating and Henrie, 2011), and Complex Adaptive Systems (Srinivasan and Mukherjee, 2018). Unfortunately, all of these papers appeared in lower ranked and lesser cited journals. There remains an opportunity to apply the powerful, adaptive methods of Systems Thinking to project management and to report it to a wider audience for criticism.

Following the No Silver Bullet argument, evidence from practice, and subjecting project management methodology and approach to a systems thinking critique, a conclusion is drawn regarding the failure of project management approaches and methodologies in practice: a single, predetermined project management methodology and approach cannot be sufficient to the needs of a large, complex project in a complex organization; it cannot

provide the requisite variety of responses, given the range of questions that the complex organization and its projects can ask of the project management methodology and approach; and that the project management methodology and approach should not be treated as a stand-alone component, but should be treated as a sub-system of the greater project delivery system.

The *No-Silver-Bullet* argument in Software Engineering that has been ongoing and unrefuted since 1987 (Brookes, 1987; Brooks, 2003; Mancl, Fraser and Opdyke, 2007; Fraser and Mancl, 2008, 2018; Galin, 2015). It is argued that this state of affairs can be extended to IT project management – there is likely no silver bullet to the challenges faced in IT project management. These aspects are listed in row 11 in Table 2.3.5-1.

Table 2.3.5-1: Gaps/Issues/Directives Identified from Literature (5)

#	**Gap/Issue/Directive**	**Obs.**	**Note**
1	Success factors where Agile does not outperform Traditional. (Khoza and Marnewick, 2020; Gemino, Horner Reich and Serrador, 2021)	2	Carried over from section 2.2.3.
2	Project management approach success before and after change within firms. This is a gap that is not well-described in the literature.	1, 2	
3	Antidote to project management approach dogmatism. (Juli, 2011; Eriksson, 2012; Lucas, 2014; Blasband, 2016; Melchizedek, 2016; Dhall, 2018; Ralph and Oates, 2018; Hillbrand, 2019; Nicolette, 2019)	3	
4	The empirical work causes the demand for theoretical work to explain the empirical findings. (Winter and Smith, 2006)	2, 3	
5	A next step for the development of project management approach is the tailoring/hybridization of project-specific approaches. (Špundak, 2014)	NA	Carried over from section 2.3.1.
6	Research & literature relating to the practical aspects of tailoring & hybridization is required. (Project Management Institute, 2017)	1, 2	
7	PMI's call for tailoring & hybridization research was not adequately answered. (McClure, 2019)	2	
8	Tool, reference guide for the comparison of project management approaches as input to tailoring & hybridization was not found. This is a gap.	2, 3	
9	Work relating to critical success factors for ITIL implementation can be built on for implementations of changes to the project management approach. (Pollard and Cater-Steel, 2009; Tan, Cater-Steel and Toleman, 2009)	2	Carried over from section 2.3.3.
10	IT project management in SA banking can be highly complex, nuanced approach is required. Argument formed from direct involvement and own research.	1, 2	Carried over from section 2.3.4.
11	Systems Thinking Criticisms of project management approaches. Argument formed drawing on various sources.	2, 3	Elaborated: section 2.3.6.

2.3.6 Gaps, Problems, Questions, & Objectives

In the previous sections of this chapter a first iteration of background research was launched into the state of project management methodology and approach literature and literature regarding the successful implementation of process improvements in IT. Apparent gaps in the literature have been noticed and served as a development from the initial observations. In this section the gaps are stated (2.3.6.1), and thereafter the problem statements (2.3.6.2), research questions (2.3.6.3), and research objectives (2.3.6.4) are derived and developed.

The research question revolves around the approach to addressing the problem statement, and the research objective is to answer the research question.

2.3.6.1 Gaps in the Literature & Directions for Research

Although a fair amount of literature was identified, and reviewed, on selection, tailoring and fusion of software development processes, the following gaps were identified in the literature:

- Papers concerning the fusion of methodologies described ‘what’ was done, but not ‘how’ it was done, which is important for this knowledge to be useful.
- Of the papers that provide employable ‘how’ knowledge on tailoring, only one is generalizable across a range of project management approaches and methodologies, as the others deal with one, specific project management methodology and approach.
- One of the key characteristics of agile methodologies is that the client is directly involved with the project. The bigger the organisation and project, the more likely it would be that degrees of removal would exist between the client and the software developers. Strategies to counter this foreseen problem has not found amongst the literature on tailoring or fusion of project management approaches and methodologies.
- Selection, tailoring and hybridization of project management approaches and methodologies seem, from the case studies, to be practiced as in-house crafts rather than a standardized function in a professional field, which leads to the amassment of tacit knowledge and increasingly fragmented literature.
- There exists a gap between theory and practice on two levels: First, when the literature that exists is not readily available and not easily usable, practitioners have little incentive to use it and add to it and, secondly, they rather create their own methods.
- There is no well-known, standardized and actively used framework for the comparison of methodologies.
- Strategies specifically developed for the implementation of improvements to project management approaches and methodologies does not exist, therefore ITIL strategies were researched as comparable situations and possibly customisable solutions.
- The reference framework of situational factors that affect the software development process lacks associated mapping between the factors and the components of the process, and even more so between the software development factors and components to the delivery process of the greater IT project.

The observation relating to the benefits realized following a significant change implemented to the project management methodology and approach (2.1.2) is most directly tied to this chapter's research of the state of the field. The majority of practitioners engaged indicated that realised benefits did not meet expectations. According to the literature reviewed (2.2.2.1), however, the utilization of a formal project management methodology and approach improve project delivery.

The first two gaps indicate a gap in the useful literature pertaining to Selection, Tailoring, and Hybridisation. The fourth gap cites evidence from case studies regarding a build-up of fragmented tacit Selection, Tailoring, and Hybridisation knowledge, and the fifth gap is an inference suggesting two factors as causes for this.

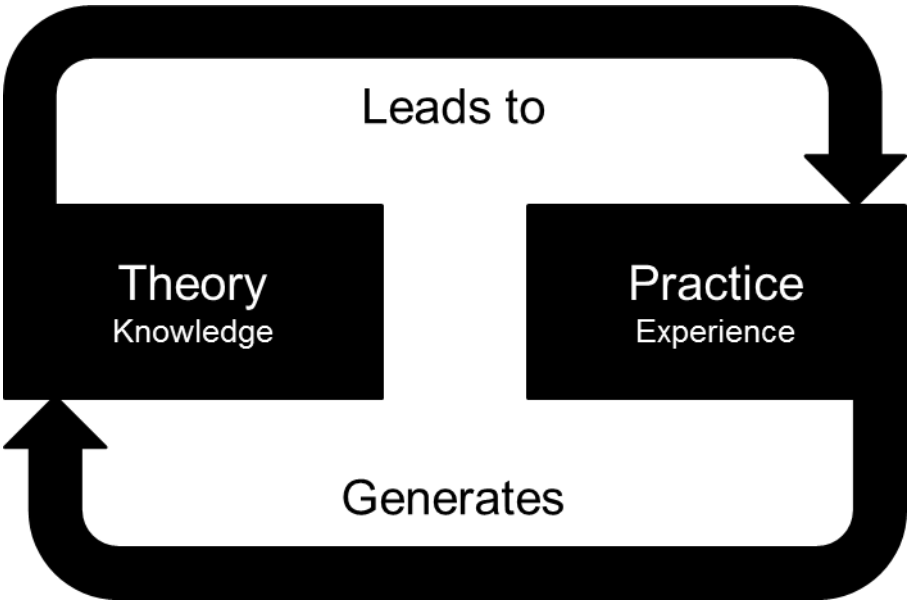


Figure 2.3.6-1: Keynes' Assertion – Theory & Practice (Winter et al., 2006)

In the final report of the *Rethinking Project Management* (Winter *et al.*, 2006) initiative, from which Figure 2.3.6-1 is copied, Keynes' claim as to 'theory leading to practice and practice generating theory' is used as inspiration for a 'Network Programme' where practitioners and academics delivered directions for future research.

Figure 2.3.6-1 is an oversimplification and may seem like an automatic process – in practice intervention is required to take theory to practice and to research is required to generate theory from practice.

Figure 2.3.6-2 is an improved version illustrating that a synthesis of theory for practice is required, and research and development is required to produce adequate theory and methods.

Furthermore, with the rectangles of Figure 2.3.6-2 overlapping, it is proposed that there should not be a hard separation between the theory and practice worlds, the synthesis of theory for practice, and the research and development from practice to produce theory and methods.

As listed in Table 2.2.3-2, the gaps identified relates to the observation and could relate indirectly to the extant project management methodology and approach dogmatism raised in 2.1.3. The argument for this would be that not having utilizable project management methodology and approach and Selection, Tailoring, and Hybridisation knowledge diffused among practitioners does not help the development of pluralism, and allows for sectarian project management methodology and approach dogmatism to grow.

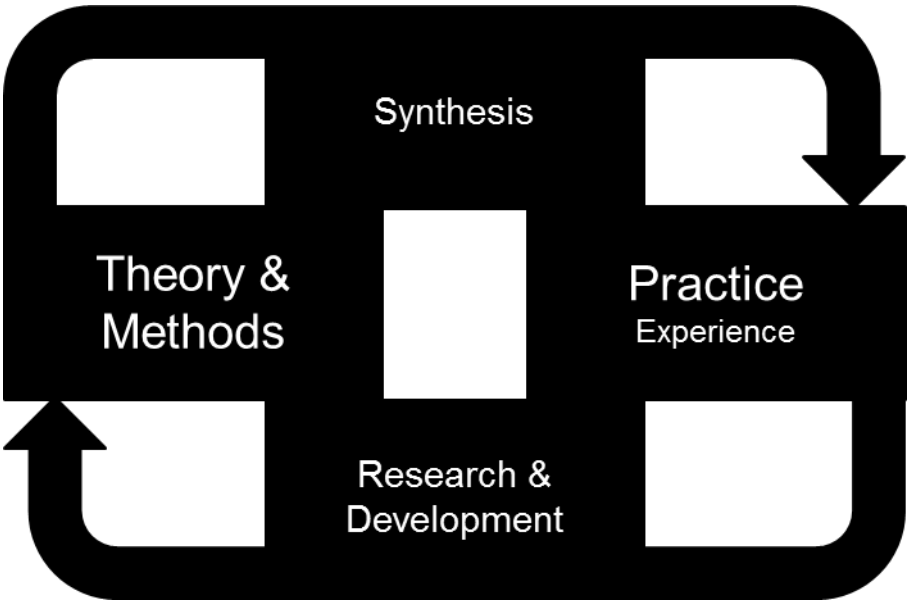


Figure 2.3.6-2: Theory to Practice to Theory

Other identified during the review of software development process literature (Table 2.3.6-2). Whereas the concept of links between situational factors and process components advised the approach to this study of IT project management approaches and methodologies, this study will not attempt to address this gap.

Table 2.3.6-1 summarized the issues and directives identified through the System Thinking criticism of project management methodologies and trace these to the observations; Table 2.3.6-2 contain the final list of gaps, issues and directives identified through this research.

Table 2.3.6-1: Systems Thinking Criticism Issues & Directives (6.1)

#	**Gap/Issue/Directive**	**Obs.**	**Note**
11	Systems Thinking Criticisms of project management approaches.	2, 3	From section 2.3.5.
11.1	Freedom & Local Management/Autonomy.	2	NA
11.2	Optimized Control.	2	NA
11.3	Optimized Adaptability.	2	NA

Table 2.3.6-2: Gaps/Issues/Directives Identified from Literature (6)

#	Gap/Issue/Directive	Obs.	Note
1	Success factors where Agile does not outperform Traditional.	2	Carried over from section 2.2.3.
2	Project management approach success before and after change within firms.	1, 2	
3	Antidote to project management approach dogmatism.	3	
4	The empirical work causes the demand for theoretical work to explain the empirical findings.	2, 3	
5	A next step for the development of project management approach is the tailoring/hybridization of project-specific approaches.	NA	Carried over from section 2.3.1.
6	Research & literature relating to the practical aspects of tailoring & hybridization is required. (Concept proposal speaks to this.)	1, 2	
7	PMI's call for tailoring & hybridization research was not adequately answered. (Concept proposal speaks to this.)	2	
8	Tool, reference guide for the comparison of project management approaches as input to tailoring & hybridization was not found. (Concept proposal speaks to this.)	2, 3	NA
9	Work relating to critical success factors for ITIL implementation can be built on for implementations of changes to the project management approach.	2	Carried over from section 2.3.3.
10	IT project management in SA banking can be highly complex, nuanced approach is required. (Concept proposal speaks to this.)	1, 2	Carried over from section 2.3.4.
11	Systems Thinking Criticisms of project management approaches. (Builds on concept proposal.)	2, 3	NA

2.3.6.2 Problem Statements

The problem statements translate the observations, literature gaps, and directions for research into issues and opportunities to be addressed. The problems (and challenges and opportunities that were identified from the gaps and directives in Table 2.3.6-2 and

Table 2.3.6-1) are stated as:

- Literary coverage of Selection, Tailoring, and Hybridisation is poor with regards to providing generalizable and utilizable subject matter. This can be traced to gaps 1-6.
  - No widely known and used frameworks or tools for the comparison of project management approaches and methodologies could be identified through the research conducted for this study and relates to gap 6.
  - No widely known and used guide or method for the selection, tailoring and hybridization of project management approaches and methodologies could be identified through the research conducted for this study and relates to gaps 1, 2, 4, and 5.
- Current perspectives on the functioning of a project within and between organizations, as found in project management approaches and methodologies, are limited and relates to gaps 10 and 11.
- Project Management Methodology and Approach dogmatism is prevalent across IT project management gaps 5 and 6.
- No widely known and used guide or method for the implementation of project management methodology and approach improvements in organizations could be identified through the research conducted for this study and relates to gap 7.

With reference to Table 2.3.6-3, the problem statements are verified as addressing the identified gaps and directions for research and, indirectly, the initial observations (Table 2.2.3-1). Leanness is also verified by ensuring that no problem statement not relating to observations is raised.

Table 2.3.6-3: Problem Statements Traced to Literature Gaps & Directions for Research

#	**Problem Statement**	**G**	**Comment**
1	Explain: Success factors where Agile does not outperform Traditional.	1	NA
2	Required research: Project management approach success before and after change within firms.	2	Not in scope for this study.
3	Required: Antidote to project management approach dogmatism. Concept proposal speaks to this.	3	NA
4	Theory required: The empirical work causes the demand for theoretical work to explain the empirical findings. Concept proposal speaks to this.	4	NA
5	Required research: A next step for the development of project management approach is the tailoring/hybridization of project-specific approaches. Tested in concept proposal.	5	NA
6	Research required: Research & literature relating to the practical aspects of tailoring & hybridization is required. Concept proposal speaks to this.	6	NA
7	Required research: PMI's call for tailoring & hybridization research was not adequately answered. Concept proposal speaks to this.	7	NA
8	Research & development required: Tool, reference guide for the comparison of project management approaches as input to tailoring & hybridization was not found. Concept proposal speaks to this.	8	NA
9	Required research: Work relating to critical success factors for ITIL implementation can be built on for implementations of changes to the project management approach.	9	NA
10	Research & Development required: IT project management in SA banking can be highly complex, nuanced approach is required.	10, 3, 1	Concept proposal speaks to this.
11	Research & development required: Systems Thinking Criticisms of project management approaches. Builds on concept proposal.	11, 10, 3,1	NA
11.1	Freedom & Local Management/Autonomy.		NA
11.2	Optimized control.		NA
11.3	Optimized adaptability.		NA

2.3.6.3 Research Questions

The research questions concern the viability of addressing the problem statements, and the approach to addressing the problem statements. This is an industrial engineering study, and the praxis professional is obligated, with reference to Figure 2.3.6-2, to conduct research and development with the aim of producing theory and methods that can be synthesized for use in practice.

The research questions are stated as:

- Can viable propositions addressing the problem statements be designed and validated?
- How should the design and validation of such propositions be approached?

The research questions relate to all the problem statements, as traced in Table 2.3.6-4.

Table 2.3.6-4: Research Questions

#	**Research Question**	**Prob. Stmt.**
1	What could the characteristics for an improved model of the large, complex IT project in SA banking be?	5, 10
1.1	A model that explains empirical findings.	1, 4
1.2	A model that takes project management approach theory and application forward.	10
1.3	A model that allows for the adherence to Systems Thinking Principles.	11
2	What could the characteristics for selection, tailoring and hybridization of project management approaches.	6, 7
3	What could the characteristics for a project management approach comparison tool be?	3, 6, 7, 8

2.3.6.4 Research Objectives

The research objectives are to answer the research questions. This is done by designing and validating propositions to address the problem statements. The validation passes a judgement on the viability of the endeavour; and the design and development concern the adequate approach to addressing the problem statements.

The research objectives are stated as:

- Design and validate a ‘model’ that will enrich the project management methodology and approach perspective on the large, complex project and relates to problem statement 2.
- Design and validate a ‘framework’ or ‘tool’ for the comparison of project management approaches and methodologies and relates to problem statement 1.1, and indirectly relates to problem statement 3.

- Design and validate a guide to Selection, Tailoring, and Hybridisation relates to problem statement 1.2.
- Design and validate a guide to the implementation of project management methodology and approach changes relates to problem statement 4.

Table 2.3.6-5: Research Objectives Traced to Problem Statements

#	**Research Objective**	**Prob. Stmt.**	**Comment**
1	Des. & validate an enriched model of project.	1	
2	Des. & validate a PMM comparison tool/framework.	2	Indirectly traceable to Prob. Stmt. 3
3	Des. & validate a Selection, Tailoring, and Hybridisation Guide.	3	
4	Des. & validate PMM change implementation guide.	4	

As stipulated in Table 2.3.6-5, problem statement 3 is not directly addressed by the research objectives. It is argued, however, that the enhanced diffusion of project management methodology and approach and Selection, Tailoring, and Hybridisation knowledge will serve pluralism and, therefore, decrease project management methodology and approach dogmatism.

Referring to the Hegel Circle, the thesis has been elaborated by contemplating root causes for the initial observations and conceptualising responses at a high level. At this point problems have been stated, research questions have been raised, and research objectives have been derived. The next step in the Hegel Circle is to stake a claim with regards to the expected value of the execution of the research objectives and the development of design requirements for the propositions. This stake is claimed by stating hypotheses to be tested for.

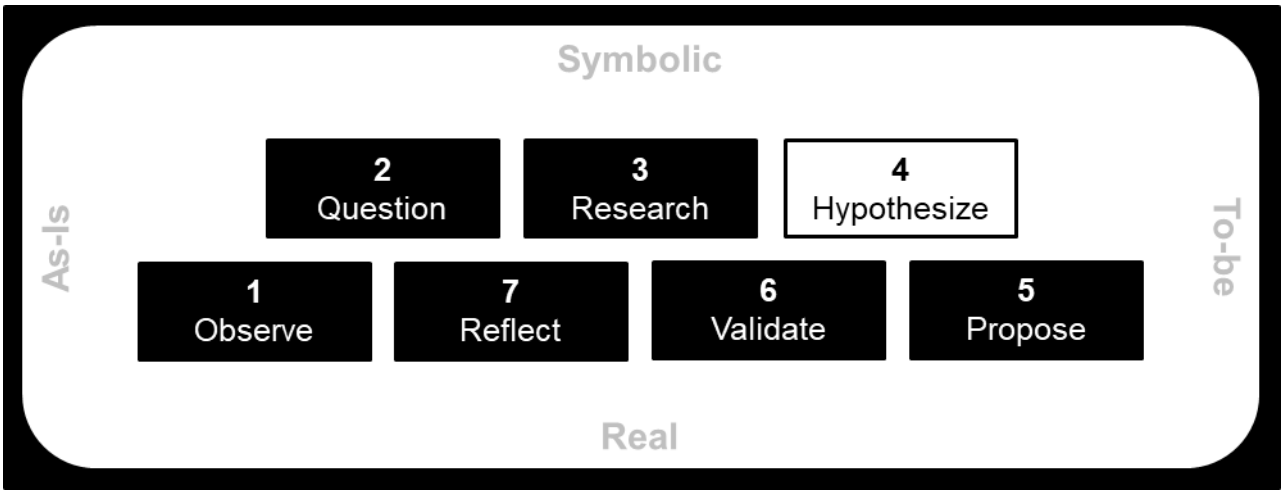
2.4 Hypothesize – Can Value be Created?

"Whatever is reasonable is true, and whatever is true is reasonable;" or

"All that is real is reasonable, and all that is reasonable is real;" or

"What is rational is actual, and what is actual is rational."

Georg Hegel



The stating of hypotheses for soft paradigm management research is more complex than for hard paradigm research. However, the Hegel Circle necessitates the statement of testable hypotheses which could at least be rejected to an extent.

In unison with the research objective, the following primary hypotheses are stated:

- Research Objective Hypothesis (Obj.H_1^1): significant value can be added to theory and practice by executing research objective.
- Research Objective Null Hypothesis (Obj.H_0^1): Executing the Research Objective will not add significant value to either theory or practice.
- Proposition Hypothesis (Prop.H_1^2): The development and validation of the propositions will be add significant value to theory & practice.
- Proposition Null Hypothesis (Prop.H_0^2): The development and validation of the propositions will not add significant value to either theory or practice.

2.4.1 Value in Executing the Research Objective

The value of executing the study lies in, or would fail to lie, in the application of systems thinking principles to PPM literature as done in this study.

It will be proposed that the argument will be made in favour and against on grounds of (hopeful) publication and overall feedback from practitioners. The examiners will be the committee who ultimately decides upon review of the thesis and conclusion of defence.

2.4.2 Value in the Propositions of the Study

Hypotheses will now be set for propositions individually, however, individual propositions will only be known at the end of next chapter. Therefore, the application of tenants of systems thinking (as will done through the propositions) will be listed in this chapter, with the more, with the specific propositions becoming clear in the next chapter.

Hypothesis 1: The variety presented by the project management methodology and approach, as a system, can be improved by hybridizing a unique project management methodology and approach for the for the individual large, complex IT project in SA banking.

Referring to the development of project management methodology and approach described in 2.3.1 and criticism raised in 2.3.4 with regards to requisite variety, it was argued that a single project management methodology and approach for an organization, portfolio or program will likely not contain the requisite responses to answer all challenges raised in a multi-project environment. The variety is increased by not pre-determining a project management methodology and approach for a group of projects and expecting these projects to follow the project management methodology and approach, but by rather hybridizing a project management methodology and approach per project.

In short, the project management methodology and approach(s) used at the organization is not limited to a predefined project management methodology and approach or set of project management approaches and methodologies.

Hypothesis 2: The variety presented by the project management methodology and approach, as a system, can be further improved by hybridizing unique project management approaches and methodologies *for individual portions of the large, complex IT project in SA banking (This would constitute a Multi-Methodology System).*

Referring to the development of project management methodology and approach in Hypothesis 1 and to the criticism raised in 2.3.4, it was argued that a single project management methodology and approach, even if hybridized for the individual project, would not have the variety of response required for a large, complex project in SA banking IT. The variety will be increased by hybridizing unique project management approaches and methodologies for different portions of the project. For example, it does not make sense to follow the same project management methodology and approach to deliver the Software Development portion and the Marketing portion – a Multi-Methodology System could provide for a uniquely hybridized project management methodology and approach for each while managing the greater project as a whole.

2.4.2.1 Viability by Increasing the Adaptability in the Hybridization of the project management methodology and approach

Hypothesis 3: The Viability of the project delivery function, as a system and referring to the Viable System Model, can be improved by increasing adaptability in hybridization of the Multi-Methodology System.

Referring to criticism raised in 2.3.4 and the Viable System Model, adaptability is required for a system to be viable. According to the Viable System Model, a project should not be a viable system – projects are designed to terminate – but the project delivery function would benefit from viability, and the individual projects can be seen as level 1 systems.

Viability can be increased by increasing the authority of 'local management' of level 1 systems – by giving greater authority to project-stakeholders to respond to situations at hand and to decide on the planning and management of the project.

- Project Management Methodology and Approach variety, as a system, can be improved by hybridizing a unique project management methodology and approach for the for the individual large, complex IT project in SA banking.
- Project Management Methodology and Approach variety, as a system, can be further improved by hybridizing unique project management approaches and methodologies for individual portions of the large, complex IT project in SA banking (This would constitute an Multi-Methodology System).

2.4.2.2 Viability by Optimizing Control in the Hybridization of, and Enabled by the Multi-Methodology System

Hypothesis 4: The viability of the project delivery function, as a system and referring to the VSM, can be improved by optimizing the control of the hybridization of the Multi-Methodology System and the control enabled by the Multi-Methodology System.

Referring to the criticism raised in 2.3.4 and the VSM, control is optimized by only controlling what can and should be controlled, and also strengthening the control of both that which can and should be controlled.

- Viability of the project delivery function, referring to the VSM, can be improved by increasing adaptability in hybridization of the Multi-Methodology System.
- Viability of the project delivery function, referring to the VSM, can be improved by optimizing the control of the hybridization of the Multi-Methodology System and the control enabled by the Multi-Methodology System.

The hypotheses have been stated and explained. The execution of the research objectives entails the development of design requirements for the propositions. The validation of these design requirements will be validated, and the results of the validation will be used as an input to the testing of the hypotheses.

Table 2.4.3-1 summarizes the proposition – the development of which will follow in chapter 2.5 – and provides traceability between the components of the proposition, the gaps and issues that were identified, and the research objectives.

2.4.3 Conclusion

This is the most elementary hypothesis that underlies every research project (or study): that it is worthwhile (or of significant value to the theory and practice of the field) to execute the study. This can be stated as:

$$H_1^1: V_{Obj.} \geq T_{Significance;\, novelty;\ implementability;\ \ldots;\, n}$$

Equation 2.4.3-1

$$H_0^1: V_{Obj.} < T_{Significance;\, novelty;\ implementability;\ \ldots;\, n}$$

Equation 2.4.3-2

Where H_1^1 is the hypothesis and H_0^1 is the alternative hypothesis regarding the value of executing the objective of the study ($V_{Obj.}$) in relation to the threshold (T) of significance, novelty, etc. expected from the research study.

Even though some slightly deeper hypotheses were pondered, the scope of the study in reality allows for the testing of only one additional hypothesis (in terms of level of detail).The second most high-level hypothesis that underlies every research project (or study) is that the development of the propositions are worthwhile (or of significant value to the theory and practice of the field) to execute the study. This can be stated as:

$$H_1^2: V_{Prop.} \geq T_{Significance;\, novelty;\ implementability;\ \ldots;\, n}$$

Equation 2.4.3-3

$$H_0^2: V_{Prop.} < T_{Significance;\, novelty;\ implementability;\ \ldots;\, n}$$

Equation 2.4.3-4

Where H_1^2 is the hypothesis and H_0^2 is the alternative hypothesis regarding the value of executing the objective of the study ($V_{Prop.}$) in relation to the threshold (T) of significance, novelty, etc. expected from the research study.

The statement of these hypotheses is deemed important for specifying characteristics against which the value of the study will eventually be tested. It is also evident that the study does not provide for exact testability (levels of testability were accepted by Popper too (Popper, 1963). What is of importance, is to test the hypotheses as well as possible, given the characteristics of the study. For this reason, the propositions were presented to expert practitioners for validation (this follows in chapter 2.6).

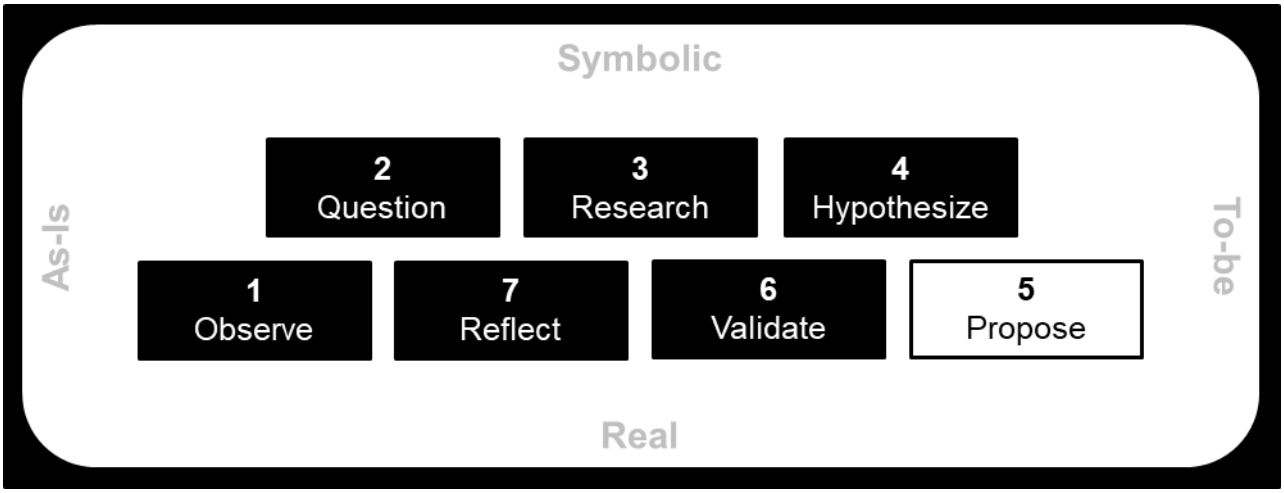
Table 2.4.3-1: Proposition – Multi-Methodology System (MMS)

#	Proposition	Description	Gap/Issue	Res Obj.	Comment
1	MMS for IT project management in SA banking.	A holistic approach to increase variety, adaptability, localized management, and maintaining adequate control whilst doing so.	Table 2.3.6-2, Table 2.3.6-1	Table 2.3.6-5	The holistic proposition speaks to the Systems Thinking notions as a first priority. As a positive externality, other issues are also addressed.
1.1	Viable Temporary System Model (VTSM)	A model of the large, complex IT project in SA banking. It allows for the use of multiple methodologies and provision of localized management while maintaining adequate control.	3, 4, 5, 7, 11	1	The VTSM presents a next step in project management methodology theory, it explains some of the recent empirical findings.
1.2	Cluster-Network Approach	A means of differentiating between the components of the project and the assembling the components of the project into a manageable network.	5, 6, 7, 11	1, 2	A practical approach to hybridization is presented. The Cluster-Network Approach is later divided into separate propositions – the Clustering of Project Work, and the Network Arrangement of Project Work.
1.3	Methodology Comparison Tool	A tool to support project management approach hybridization and the application of the Cluster-Network Approach.	3, 6, 7, 11	3	The tool can be applied during hybridization and provides information that can be an antidote to methodology dogmatism.

2.5 Propose – Multi-Methodology System Ideation & Design Requirements

"Knowing is not enough; we must apply. Willing is not enough; we must do."

Johann Wolfgang von Goethe



The research into the state of the field and the critical analysis of project management approaches from a Systems Thinking (chapter 2.3) perspective highlighted a number of issues (Table 2.3.6-2). Specifically, the conclusion was that approaches to project management must adhere to the Systems Thinking *Law of Requisite Variety*.

It is one thing theorize that the methodological variety enabled by project management approaches should be increased. The next step is to process the theoretical argument into a proposition. The proposition is an example of taking the theory to practice. In addressing the *Law of Requisite Variety*, the *Viable System Model* (VSM) was used as a foundation for the development of the proposition of this study. The proposition is a *Multi-Methodology System for IT Project Management in SA Banking*. This is also the execution of the research objectives which revolves around addressing the research questions (Table 2.3.6-5). When the propositions are validated in Chapter 2.6, it enables a test of the hypotheses stated in Chapter 2.4.

In terms of the Hegel Circle the outcome of the research (2.3) was a thesis – an interpretation of practice. The thesis is abstract. The hypothesis looks forward to the alternative version of practice that could be an improvement over the current situation. The hypothesis as yet is still abstract. The formulation of the propositions is a synthesis between the ideals hypothesized and the reality of practice. A hypothesis could completely reject the thesis (the current state of the practice), but the formation of the propositions is the *aufheben* which demands applicability to the current reality of practice.

As the name says, the Multi-Methodology System increases methodological variety by enabling the utilization of multiple methodologies for a single project. The quest to increase the methodological variety has further implications that relate to Systems Thinking.

Adaptability to the needs of a project and the greater organization is preferred over predetermined approaches to project management. Greater autonomy is required not only for the management of the project, but also for the management of the constituent components of the project. Enabling the use of multiple methodologies and increasing adaptability notwithstanding, it is necessary to maintain adequate control of the project.

The Multi-Methodology System, and its constituent components, are proposed as a holistic approach to increase variety, adaptability, localized management, and maintaining adequate control whilst doing so. The components of the Multi-Methodology System are:

- The Viable Temporary System Model
- The Clustering of Project Work
- The Methodology Comparison Tool
- The Network-Arrangement of Project Work

The Viable Temporary System Model is an application of Stafford Beer's VSM of the organization to the project, or temporary organization. This model explains how certain components of a system can be granted the freedom of localized management, while maintaining control over the greater system.

The 'Cluster' part of the Cluster-Network Approach provides a means of differentiating between the components of the project and the management intervention required by these components.

The 'Network' part of the Cluster-Network Approach provides a means of assembling the components of the project into a manageable network of 'Delivery Units'.

The Methodology Comparison Tool provides suggestions regarding methodological choices and combinations during the hybridization of the project.

Table 2.4.3-1 provides an additional outline of the Multi-methodology System and its components. It also provides traceability to the gaps and issues identified during the research (2.3.6) and the research objectives (2.3.6.4). The aim of this is to show how each part of the proposition speaks to gaps and the research objectives.

The design requirements of the components of the Multi-Methodology System, the Viable Temporary System Model (2.5), the Cluster-Network Approach (2.5.2 and 2.5.3), and the Methodology Comparison Tool (2.5.3) follows thereafter.

The application of the Multi-Methodology System follows in Part 2.5.8, where it is described as it was presented to IT project management practitioners in SA for validation.

2.5.1 Design Requirements for the Viable Temporary System Model

The Viable Temporary System model is proposed as a model of the large, complex project in SA banking. A foundation is required on which a project management approach can be

constructed that would offer greater variety, adaptability, and localized management, while maintaining adequate control – this is the first design requirement of the Viable Temporary System Model.

Models of projects were reviewed as presented in Prince2 (traditional and agile), the PMBOK (traditional and agile), DSDM[60] Agile, and various other approaches, methodologies, and standards. None of these sources provided a model which adequately explains the project as an organ within the greater organization, or as a multi-faceted (temporary) organization in and of itself. The VSM, created by Stafford Beer, was identified as a model which could be applied both as an explanation of the project as an organization and as part of the greater organization.

The VSM is utilized as the chief theoretical foundation for the Multi-Methodology System. The VSM was developed by Stafford Beer between the late seventies and middle eighties, and its claims have not been refuted since its inception (Schwaninger and Scheef, 2016). The representation of the VSM that follows is built on the Beer's own work (Beer, 2002), descriptions by a respected Systems Thinking authors (Parker and Britton, 1993; Jackson, 2003; Hildbr and Bodhanya, 2015) and various works applying the VSM to the field of IT (Schwaninger, 2000, 2019; Shaw *et al.*, 2004; Ríos, 2006; Boyd and Jaworski, 2009; Buckl, Matthes and Schweda, 2009; Murad and Cavana, 2012; Regaliza, 2014; Bathallath, Smedberg and Kjellin, 2016).

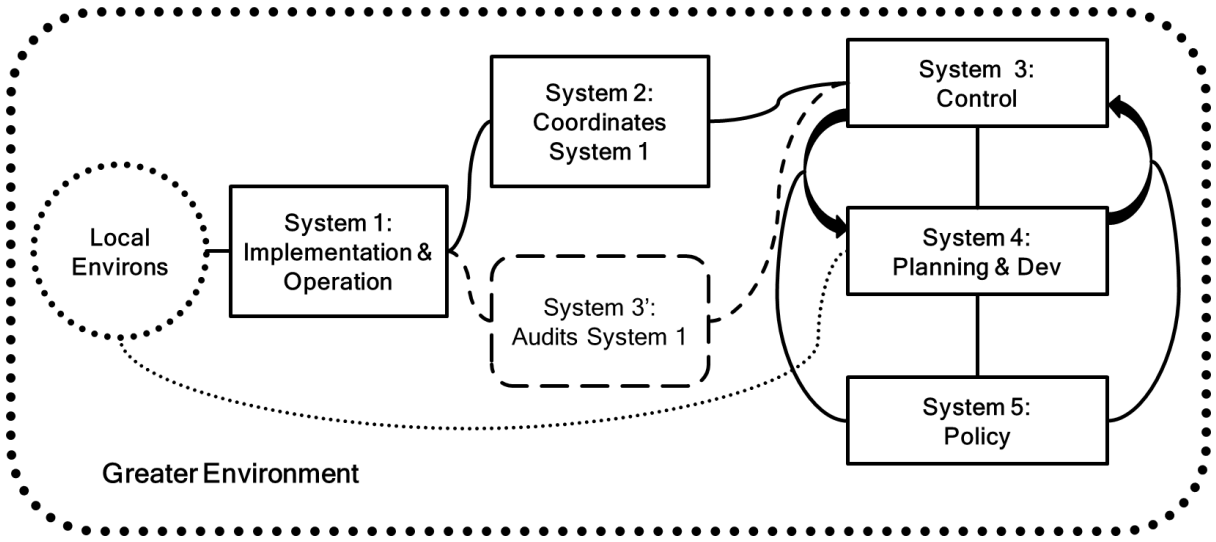


Figure 2.5.1-1: The VSM

The VSM consists of five systems, as illustrated in Figure 2.5.1-1, and is based on the structures found in viable biological systems. These systems have the functions of planning, executing, monitoring and controlling the viable system's present and future response to the environment.

[60] Dynamic Systems Development Method Agile Project Framework.

Mapping the constituent systems of the VSM to a SA bank would yield:

- System 5: The highest level of management where decisions are made on the strategic direction of the organization. This does not have to be a single entity.
- System 4: This is the level of management where the strategic directions are translated into a strategic roadmap consisting of tactical initiatives. The tactical initiatives are translated into projects that would ultimately deliver on the strategy of the organization.
- System 3: This is where the project office, compliance, and the like would be situated.
- System 2: Programme management (for this first example).
- System 1: Project management, illustrated in Figure 2.5.1-2.

Adaptability and variety are increased by allowing for local management of projects (System 1 components), as illustrated in Figure 2.5.1-2.

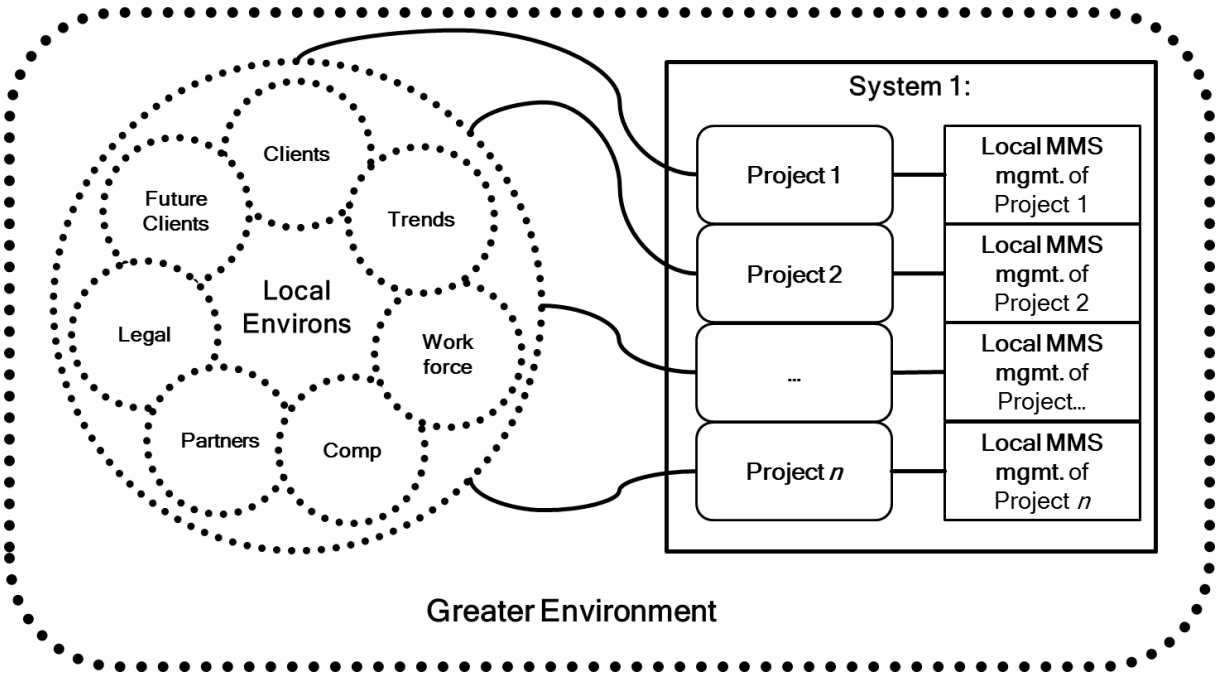


Figure 2.5.1-2: The VSM - System 1 Expanded

The VSM requires localized management of the System 1 components. The reason for this is that the System 1 components directly affect, and are directly affected by, the environment 'outside' of the organization. The variety of impacts from the environment is too rich to adequately plan for or prescriptively approach. It is only by allowing localized management to the System 1 components that adequate adaptability and variety in response to the environment can be assured. Simply put: the System 1 components are allowed to play the ball as it lies, since it is never possible to predict where and how the ball will lie.

Applying the Viable System Approach to project management, it is argued that a project should not be managed according to a prescriptive approach, since there are too many unique characteristics to each project – no prescribed approach can offer the necessary variation, and if maximum variation is lead with, the prescribed approach would be overcomplicated.

Rather than prescribing a project management approach, it is proposed that minimum governance and other management information requirements[61] are demanded from the project from System 2 and System 3. The important aspects to enable this functioning, is an understanding of which elements can be monitored, which can be coordinated and controlled, which can be planned for; and from which locations within the VSM these functions can be delivered.

The biological nature of the VSM becomes particularly helpful by allowing for scaling in an organic fashion. The rule is stated that none of the systems 2-5 are supposed to become viable systems individually, but System 1 components may become viable systems. The difference between Beer's conception of the viable system and projects is that Beer described indefinite organizations, while projects are by definition temporary organizations. The second design requirement of the Viable Temporary System Model is to apply the VSM to the temporary organization.

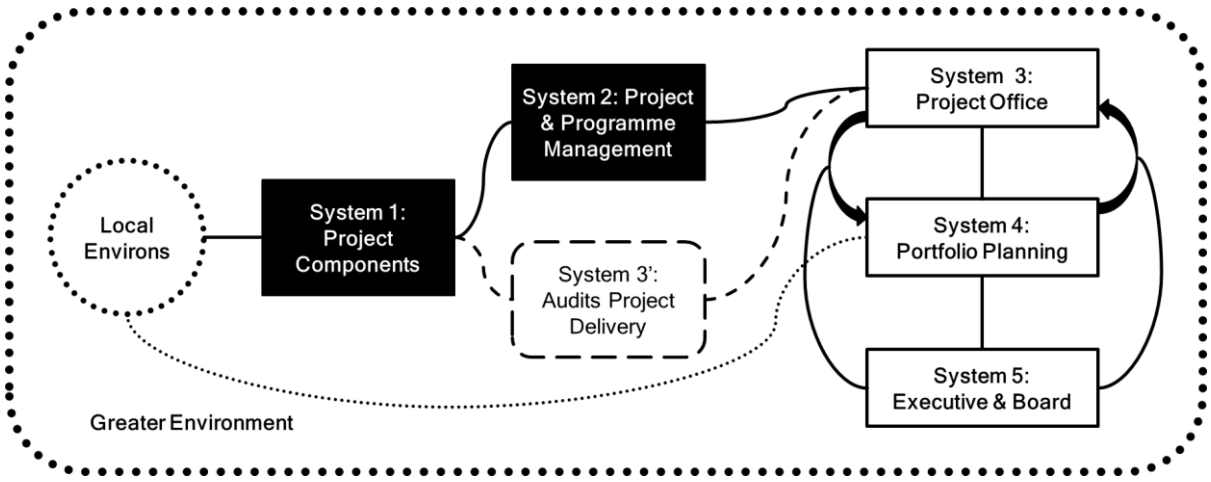


Figure 2.5.1-3: The VSM Adapted – The Viable Temporary System Model

The VSM, adapted for IT project management in SA banking, is illustrated in Figure 2.5.1-3. Project management moves from System 1 to System 2. Whereas the VSM permits System 1 components to become viable systems, the temporary nature of the project implies that certain organs of the organization will remain external to the project. In cases of very high-priority projects a dedicated project office may be created for the project, however, at least System 4 and System 5 will always remain external to the project. This is the feature that differentiates the Viable Temporary System Model from the VSM.

Project Management is the local management of projects. In order to adhere to the VSM idea, projects will be locally managed employing Multi-Methodology Systems, as part of System 1. Autonomy needs to be allowed for project stakeholders to take decisions on the best immediate responses to signals from the environment.

[61] First National Bank employed a 'minimum governance' approach to project management. It is not certain at this time how this approach will be impacted by their adoption of DevOps.

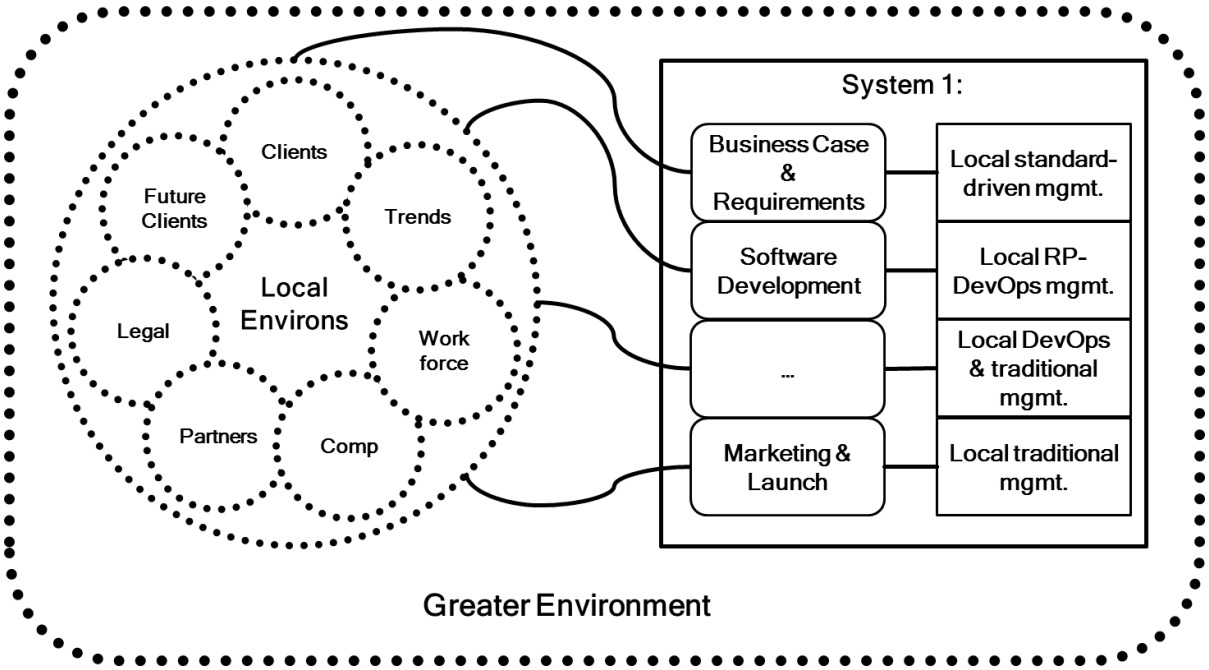


Figure 2.5.1-4: Multi-Methodology View of VSM for Project

Multiple methodologies for a project, with reference to the Viable Temporary System Model, is illustrated for System 1 in Figure 2.5.1-4. The significant components of the project are individually managed. The delivery of the components is coordinated and audited, at the project level, as illustrated in Figure 2.5.1-3.

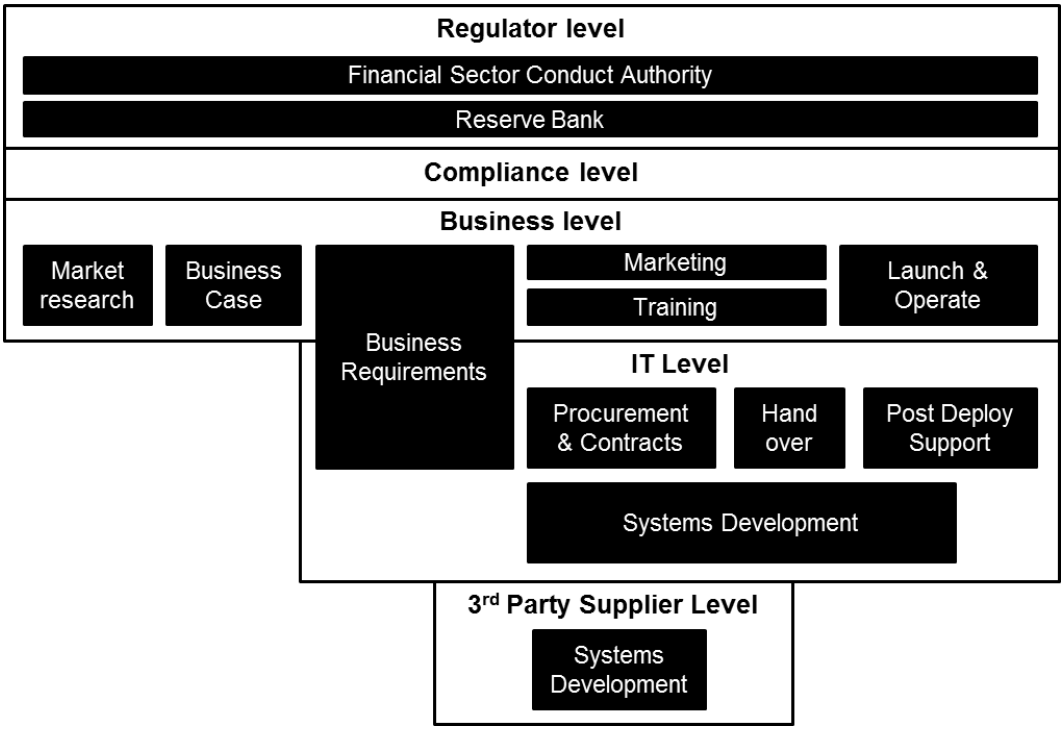


Figure 2.5.1-5: Components of an IT Project in SA Banking

The project being a temporary organization that may become a viable temporary system in itself aligns with Špundak's assertion that the application of project management approaches should progress from hybridizing an organisational project management

approach to hybridizing an approach for the individual project (Špundak, 2014). It goes further by providing for the adoption of unique methodologies for the delivery of the individual components (Figure 2.5.1-4) of the project.

Regarding Figure 2.5.1-5, observe that that the different parts of the same project can differ greatly regarding the type of work and the part of the organization where the work is executed.

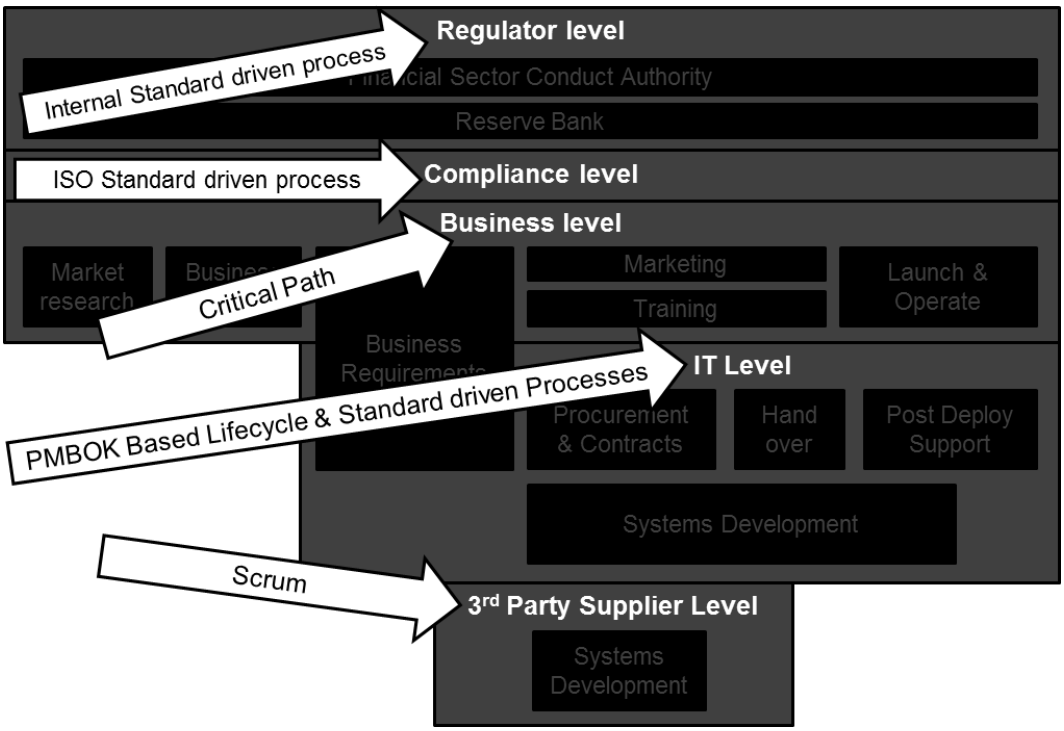


Figure 2.5.1-6: Different Methodologies for Components of an IT Project in SA Banking

Delivering the different components of the project by unique approaches (Figure 2.5.1-6) could be beneficial and possible when the project is a Viable Temporary System allowing for the local management of System 1 components. As long as the necessary information is communicated as and when determined, and outputs are delivered to the agreed constraints, it is argued that each component could conceivably adopt a unique approach and maintain autonomy.

The design requirements of the Viable Temporary System Model are summarized in Table 2.5.1-1.

The Viable Temporary System Model implies further requirements in order for it to be implementable. An approach to determining the adequate methodology for the System 1 components of the project is required. This approach is described in section 2.5.2 and a tool to support this approach is described in section 2.5.3. There is also the requirement for an approach to managing the integrated delivery of the System 1 components. This is described in section 2.5.3.

Table 2.5.1-1: Viable Temporary System Model (VTSM) Design Requirements

#	VTSM Design Requirements	What it Produces/Enables	Comment
1	Produce a model of the large complex project that lays the foundation for unique project management approach and methodology hybridization for the individual project.	The VTSM. A foundation on which a project management approach can be constructed that would offer greater variety, adaptability, and localized management, while maintaining adequate control A model of the large complex IT project in SA banking that allows for increased self-organization and autonomy (localized management) at the sub-project level. A model of the large complex project that allows for the use of multiple project management methodologies in a single project's management approach. A model of the large complex project that would allow for adequate integration management and control whilst providing greater freedoms. Additional to the stated requirements, this model is a next step in the development of project management approach theory.	The VTSM speaks to Gaps & Issues 3, 4, 5, 7, 11 (Table 2.3.6-2) and the 1st Research Objective (Table 2.3.6-5). Can be traced to problem statements 1.2, 1.3, 2.1, 2.2, 2.3, 2.4; and research objective 1. Large, complex IT projects in SA banking is the focus-area for the research.
2	Apply the VSM to project management. • Map project organization components to VSM components. • Describe the autonomy and local management requirements of System 1 components. • Enable the use of multiple project management methodologies in a single project's project management approach. • Enable adequate integration management and control whilst providing greater freedoms.		
3	The model needs to be useful & usable for large, complex IT projects in SA banking.		

2.5.2 Design Requirements for the Clustering of Project Work

The Viable Temporary System Model provides a description of the project that allows for the local management of the System 1 components of the project. The delivery of the components of the project can be managed following unique methodologies. An approach to determining the management needs of the components of the project is required. This approach is referred to as the Clustering of Project Work and forms part of the Cluster-Network Approach proposition.

The Clustering of Project has a simple goal: To understand the constituent work of the project as well as possible. When the work is understood, then project work can be *clustered* into logical System 1 components. An adequate management methodology can then be hybridized for these components. The components can then be locally managed.

The required understanding of the project work is achieved by assessing various characteristics of the project work.

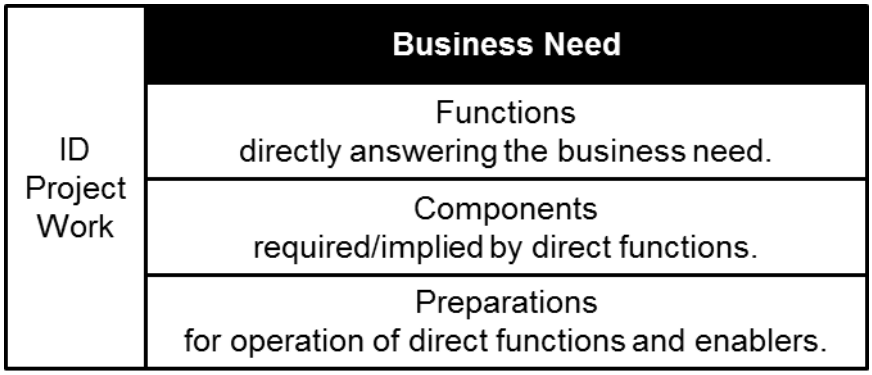


Figure 2.5.2-1: First Assessment of Project Work for Clustering

The IT project in SA banking, as is the case in many other settings, stems from the creation of a temporary organization (the project) to address a specific business need. In order to plan the appropriate approach to the management of the project, the work implied in addressing the business need requires analysis.

The high-level project deliverables (refer to Figure 2.5.2-1) that can be derived from the implications of solving a business need can be defined at an early stage as:

- Functions directly addressing the business need – like transactional functionality and the ability to enact these transactions through mobile banking applications and automated teller machines.
- Components required or implied by the direct functions – like the regulatory requirements relevant to the planned transactional functionality and expanding the existing IT infrastructure to accommodate the resultant data processing requirements.
- Preparations for the operational management of the new product – like the training of client-facing and back-office staff.

The significance of this division lies in the downstream choices between agile, traditional, and DevOps choices. The agile ideal of having the client of the project directly involved with

project execution is feasible when client involvement is lean. The functions directly relating to the business need can greatly benefit from the client's involvement. Requirements may be flexible and adapted *en via* as it relates to transactional functionalities that should be available first and the look and feel of virtual channel interfaces. The product owner, supported by a user experience specialist, for example, would fulfil the role of the client this part of the project.

Requirements for the enablement of the 'direct functions' from an IT infrastructure point of view, for example, can be derived from the direct functions and would not necessarily benefit from the involvement of the client in day-to-day delivery. For the delivery of these enablement-type components, a traditional approach or DevOps approach may be optimal.

The preparation for the operation of the new product may again benefit from direct client involvement. Whereas the product owner may not be adequate for the client-role as it pertains to this part of the project, a series of operational managers may be required to play client-roles.

The deliberation regarding the adequate person(s) to play the role of the client for different parts of the project is one of the reasons why an IT project in SA banking can soon become a large, complex project. Over and above the absolute budget or the amount of function points that can be counted, the variety of systems and organisational units impacted by the project give rise to magnitude and complexity.

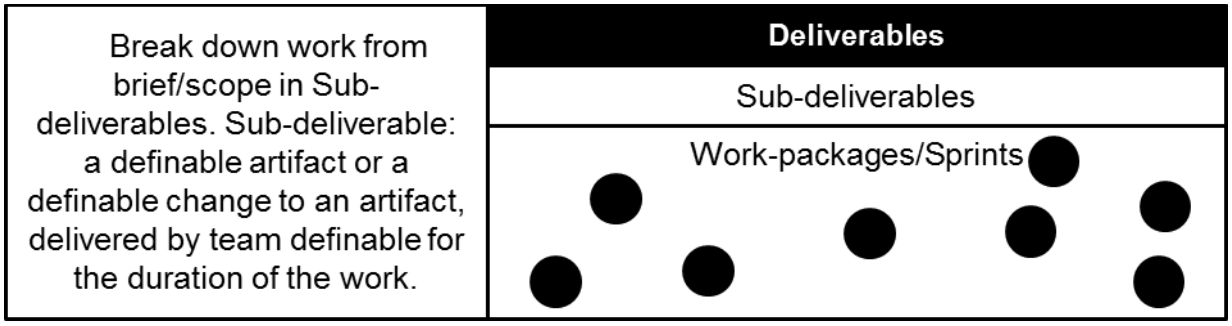


Figure 2.5.2-2: Second Assessment of Project Work for Clustering

The next elaboration (refer to in Figure 2.5.2-2) involves identifying the sub-deliverables that make up the main deliverables of the project. The sub-deliverables will likely strongly pertain to distinct organisational capabilities, like, as examples, marketing or software development. These are often referred to as 'streams'.

The sub-deliverables can be elaborated by describing the work packages (in the traditional sense) or the requirements that can be grouped in sprints (in agile), by which the sub-deliverable would be delivered. These are referred to as delivery units.

The delivery unit can be assessed according to the context (referring to Figure 2.5.2-3) wherein it is delivered. For example, the dependencies on the delivery unit within the project, or the dependency on the artefact produced by a delivery unit as an input to another project. Or, the regulatory implication of the artefact produced by the delivery unit – in this case the delivery unit is also executed in an inter-organisational context.

The significance of the context is that the delivery unit is dependent on the context in terms of inputs and the contexts require certain outputs. The delivery unit requires inputs from inside the project, from the rest of the organization, and from entities outside of the organization. On the other hand, entities within the project, within the organization and perhaps outside of the organization require outputs from the delivery unit.

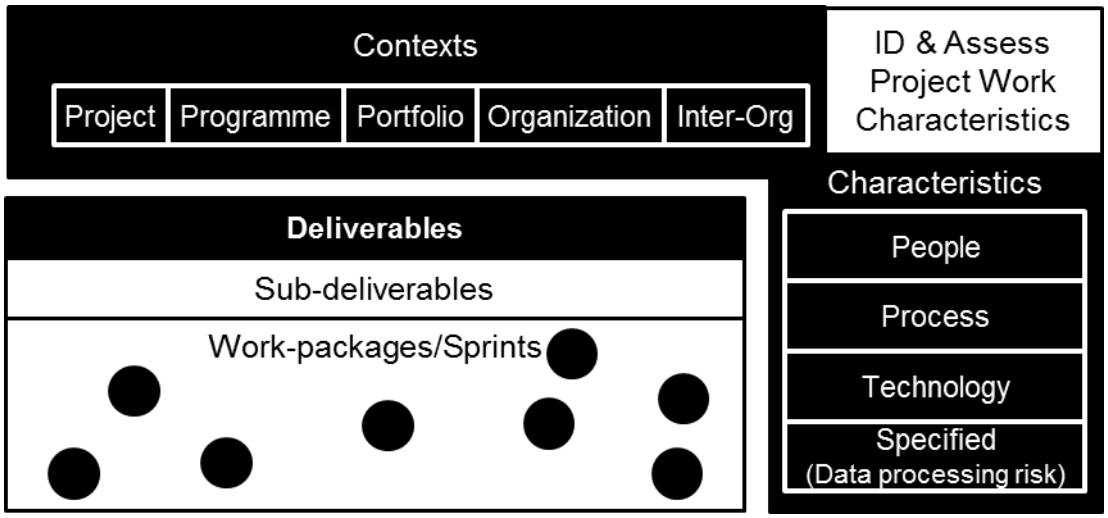


Figure 2.5.2-3: Third Assessment of Project Work for Clustering

The delivery unit can be assessed (still referring to Figure 2.5.2-3), furthermore, by analysing characteristics. People, process, and technology characteristics provide a starting point, and others can be specified as is necessary.

With regards to the 'people' characteristics the following may be assessed:

- How skilled and experienced are the team responsible for the software engineering relating to the new transactional functionality?
- Who are the people who will support the new functionality? How does the new functionality differ from the suite that they already support?
- Who are the end-users of the new functionality and how sophisticated are they?

The characteristics of the team responsible for the delivery has an implication on the degree of freedom with which they can operate.

The sophistication of the end-user has an implication on the need for the client to be directly involved and for the client to be supported by a user experience specialist.

With regards to process characteristics the clarity, adequacy, simplicity, and knowledge of existing processes (still referring to Figure 2.5.2-3) can be assessed. In the positive case less intervention may be required from a project manager, in the negative case more detailed planning and direct management may be required.

With regards to technology characteristics (still referring to Figure 2.5.2-3), the novelty of the technology, for example can be assessed:

- To the team responsible for the delivery unit.
- To the organization.
- To the local banking and finance industry.

- To the global banking and finance industry.
- To the global economy.

The idea being that greater risks are assumed when working with more novel technology, leading to more direct management in terms of project risk.

	Types of Project Work
Divide Project Work	Project Management – Integration Functions
	Project work delivered by persons directly (temporarily) reporting to project manager.
	Project Work delivered by teams reporting to a Team Lead.

Figure 2.5.2-4: Fourth Assessment of Project Work for Clustering

The next step in the processing of project work, referring to Figure 2.5.2-4, concerns the teams responsible for the deliverables. Three grouping of work are distinguished:

- The project management work concerns, for example, the integration of the delivery of different teams – like enabling the integration between the delivery of new transactional functionality, accurate marketing of the new functionality, and training client support with regards to the new functionality.
- Work delivered by resources directly reporting to the project manager for the duration of their delivery – this could include, for example, a business analyst during a requirements analysis phase or a specialist software tester brought on board for a specific function and reporting directly to the project manager.
- Work delivered by teams reporting into Team Leads – like a software development team and an IT infrastructure team whose Team Leads maintain report with the project manager.

The last analysis of the project work, referring to Figure 2.5.2-5, concern the nature of requirements identification and service level agreements or contracts with 3rd party suppliers, since these aspects will have an impact on the methodological choices that are applicable during the hybridization of the project management approach. A couple of characteristic-questions include:

- Can the requirements be determined and set in stone before execution commences?
- Is the delivery of a piece of functionality dictated by a service level agreement or contract (for internal and external suppliers)?
- Is it expected that the resource requirements and cost of the project will start to exponentially increase at some point?
- Is direct client involvement absolutely required and the requirements subject to change at any given point in time?

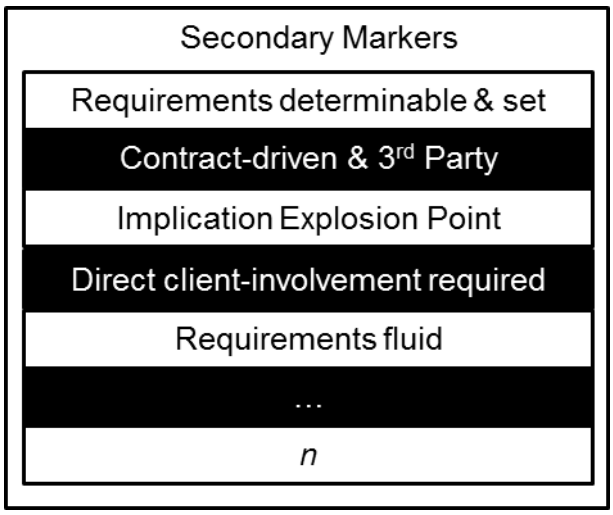


Figure 2.5.2-5: Fifth Assessment of Project Work for Clustering

With the benefit of the information gathered concerning the project, the deliverables, and the work necessitated to execute the project, the project work can now be grouped into clusters of work requiring similar methodological management approaches. And, for the clusters unique methodologies can be hybridized.

Just like the Viable Temporary System Model necessitated the *Clustering of Project Work*, the hybridization requires information and recommendation that will support the hybridization process. The Methodology Comparison Tool and Guide are proposed in this regard and discussed in the next section (2.5.3).

The design requirements for the Clustering of Project Work are summarized in Table 2.5.2-1.

Table 2.5.2-1: Clustering of Project Work (Clustering) Design Requirements

<table>
<tr><th>#</th><th>Clustering Design Requirements</th><th>What it Produces/Enables</th><th>Comment</th></tr>
<tr><td>1</td><td>Enable a sophisticated understanding of project work. Guide the assessment of project work with regards to:
The business need addressed.
Analysing project work according to characteristics & contexts.</td><td rowspan="3">Clustering is a means of assessing the project's constituent work in order to gain a useful understanding of it (the project work).

Once the project's constituent work is sufficiently understood, clusters of work can be formed which requires similar management approaches.

Clustering of project work also provides a guide to this assembly of the assessed project work.

Clustering is an implied requirement stemming from the VTSM, and also implies further requirements:
A 'tool' or resource and process or guide to provide recommendation, guidance, and information to support the hybridization of the approaches for the clusters – the Methodology Comparison Tool addresses this implication.
A means of achieving integration over different clusters following disparate approaches – the Network Arrangement addresses this implication.</td><td rowspan="3">The Clustering of Project Work addresses Gaps & Issues 5, 7, 11 (Table 2.3.6-2) and the Research Objective 2 (Table 2.3.6-5).

Clustering addresses implications specifically implied by the VTSM, like:

Clustering Design Req. 3 – Enable an understanding of which elements can be monitored, which can be coordinated and controlled, which can be planned for; and from which locations within the VSM these functions can be delivered.</td></tr>
<tr><td>2</td><td>Guidance on the grouping (clustering) of assessed work.
Responsible roles for direct management portions of work.
Characteristics of the requirements.</td></tr>
<tr><td>3</td><td>Enable an understanding of which elements can be monitored, which can be coordinated and controlled, which can be planned for; and from which locations within the VSM these functions can be delivered.</td></tr>
</table>

2.5.3 Design Requirements for the Methodology Comparison Tool & Guide

With the assessment of the project deliverables, the characteristics of the implied work, and the contexts wherein delivery occurs, the hybridization (Figure 2.5.3-1) of the Multi-Methodology System can ensue.

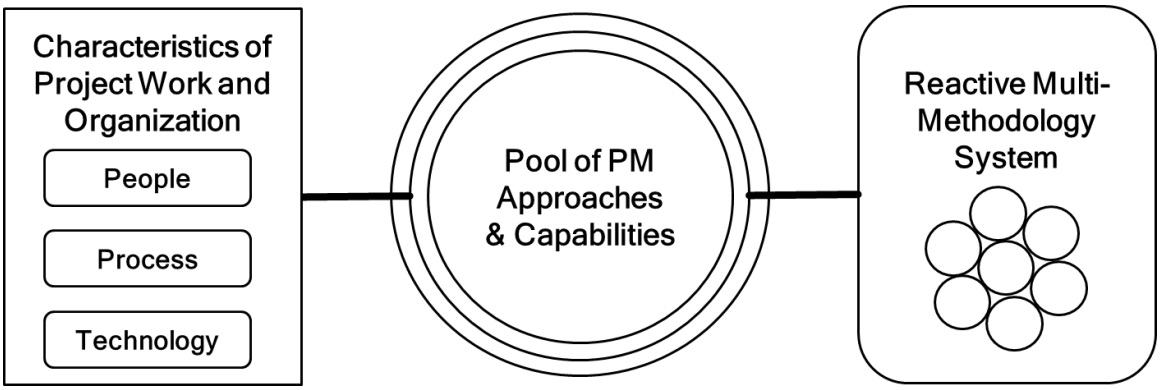


Figure 2.5.3-1: The Reactive Multi-Methodology System

The hybridization of the Multi-Methodology System is a response to the characteristics and contexts of the project rather than a predetermined approach and methodology, as illustrated in Figure 2.5.3-1. It has to be assumed that governance requirements had been optimized, minimized, predetermined and made known to project managers.

It can therefore be stated that whereas the governance requirements communicated to the project had been pre-set, and the characteristics and contexts of the project are what they are, it is the project management approach that is adaptable, and that should be adapted in order to optimize project delivery.

The hybridization for System 2, the coordination and integration function – project management work – is completed first. The first step is illustrated by Figure 2.5.3-2. There are aspects of the project that determine whether agile or waterfall can feasibly be adopted as the foundational project management approach, and there are aspects that should strongly dissuade the practitioner from selecting either agile or waterfall as a foundational approach.

There are situations wherein a waterfall approach must be strongly considered as the foundational approach. This is when all documented requirements must be delivered on – when there is no division between must-do, should-do, or would-do requirements. One of the key features of agile is that the requirements are flexible, while timelines and resources are not. Furthermore, waterfall is an appropriate choice as a foundational approach when requirements can be known beforehand, and are fixed and inflexible.

Another factor that would strongly count in favour of a traditional approach, is when the project is expected to reach a point referred to as an implication explosion. An example is a project where an extensive analysis and design phase is required to identify the requirements. The design phase may have a relatively small resource impact, whereas the execution (or build) stage may see exponential growth in resource and budgetary

requirements. In this case linear progress, finalized specifications, and stage gated approvals before venturing into execution would be an important risk mitigation.

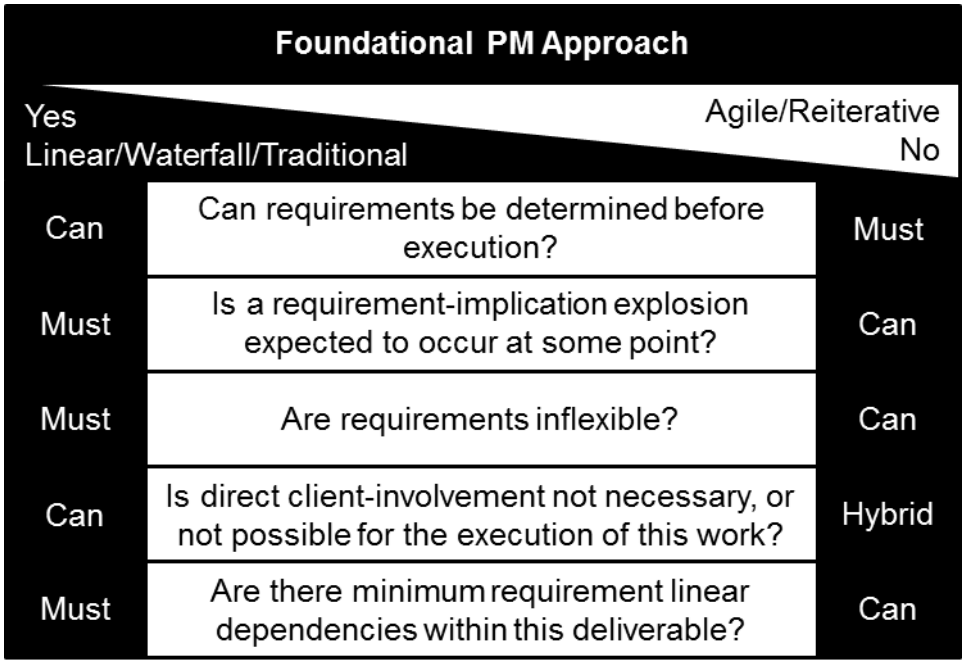


Figure 2.5.3-2: Foundational Project Management Approach

Similarly, still referring Figure 2.5.3-2, there are characteristics that would strongly favour the adoption of agile as the foundational project management approach. In many cases these speak to the opposites of the characteristics counting in favour of traditional approaches. If requirements cannot be determined before an execution phase, if requirement changes are not expected to have a great impact on budgets or the like, and if there is a healthy mix of must-do, should-do, and would-do requirements, agile would present the better choice for a foundational approach.

It follows that there can be a case where there is little clarity regarding the final requirements, which counts out traditional approaches, but also the expectation that implication explosion may occur in the execution (or build) stage of the project. In this case it would be proposed that an agile project undertaken with the goal of delivering the requirements design. The agile approach may be combined with rapid prototyping to further enhance the requirements and design finalization. The build (or execution) for the production version of the deliverables can be approached as new project for which design and requirements had been delivered at a high level of confidence.

The Methodology Comparison Tool supports the selection of the foundational project management approach. The factors indicated in Figure 2.5.3-2 are presented as questions requesting multiple-choice responses. The tool produces a recommendation with explanation following the input.

The next step in the hybridization is to reinforce the chosen foundational project management approach with characteristics of other project management methodologies box. The Methodology Comparison Tool provides feedback regarding the characteristics of, say, DSDM Agile that can be combined with a foundational Waterfall approach based on Prince2 (Figure 2.5.3-3). The Methodology Comparison Tool also provides feedback on the

characteristics which are mutually exclusive between different project management approaches (Figure 2.5.3-4). The questions posed by the Methodology Comparison Tool, according to which recommendations are produced, relate to the information produced during the assessment of project work as presented in the description of the Clustering of Project Work in the previous section (2.5.2).

ID Possible Base Approach using MCT	**Wikis for MCT**
	Provide project approach options best suited to:
	X, Y, Z primary markers.
	A, B, C secondary markers.

Figure 2.5.3-3: Wikis for a Base Approach using the Methodology Comparison Tool

The process of hybridization can then be repeated for the clusters with the Methodology Comparison Tool supporting the selection of a foundational methodology and enabling the reinforcement of the foundational methodology with complimentary characteristics presented in other methodologies.

Assess Reinforcing Approach using MCT	**Wikis for MCT**
	Show methodological characteristics of approaches that are mutually exclusive.
	Show methodological characteristics that can be combined.
	Provide information on project management approaches and characteristics.

Figure 2.5.3-4: Wikis for Reinforcing the Base Approach

The process as illustrated in the diagrams in this section, and as described in the text in this section, may seem complicated. It is argued though that the hybridization of the Multi-Methodology System is intuitive in practice, and can be summarized by the following points:

- First, the characteristics of the project, the constituent work, and the extra-project environment must be assessed and understood.
- Second, the constituent work is organized into clusters.
- Third, the temporary organization – the project – is constructed to suit the demands of the work to be completed and the characteristics of the greater organization.
- Fourth, an adequate foundational project management approach is chosen for the overall project and reinforced with value-adding characteristics of other project management methodologies. This process is repeated for the clusters.

There are a couple of things to note. First, this is the process that already plays out in practice, the Multi-Methodology System is not a novel approach to project management, but rather presents a novel attempt to formalize and support this process. Secondly, whether an

organization claims to run fully Agile or steadfastly Waterfall, the fact is that it is nearly impossible for either to be the case, and the reality is that a project progresses linearly at the highest level, reiteratively at the middle levels, and linearly again at the lowest levels where actual work, like programming, is done.

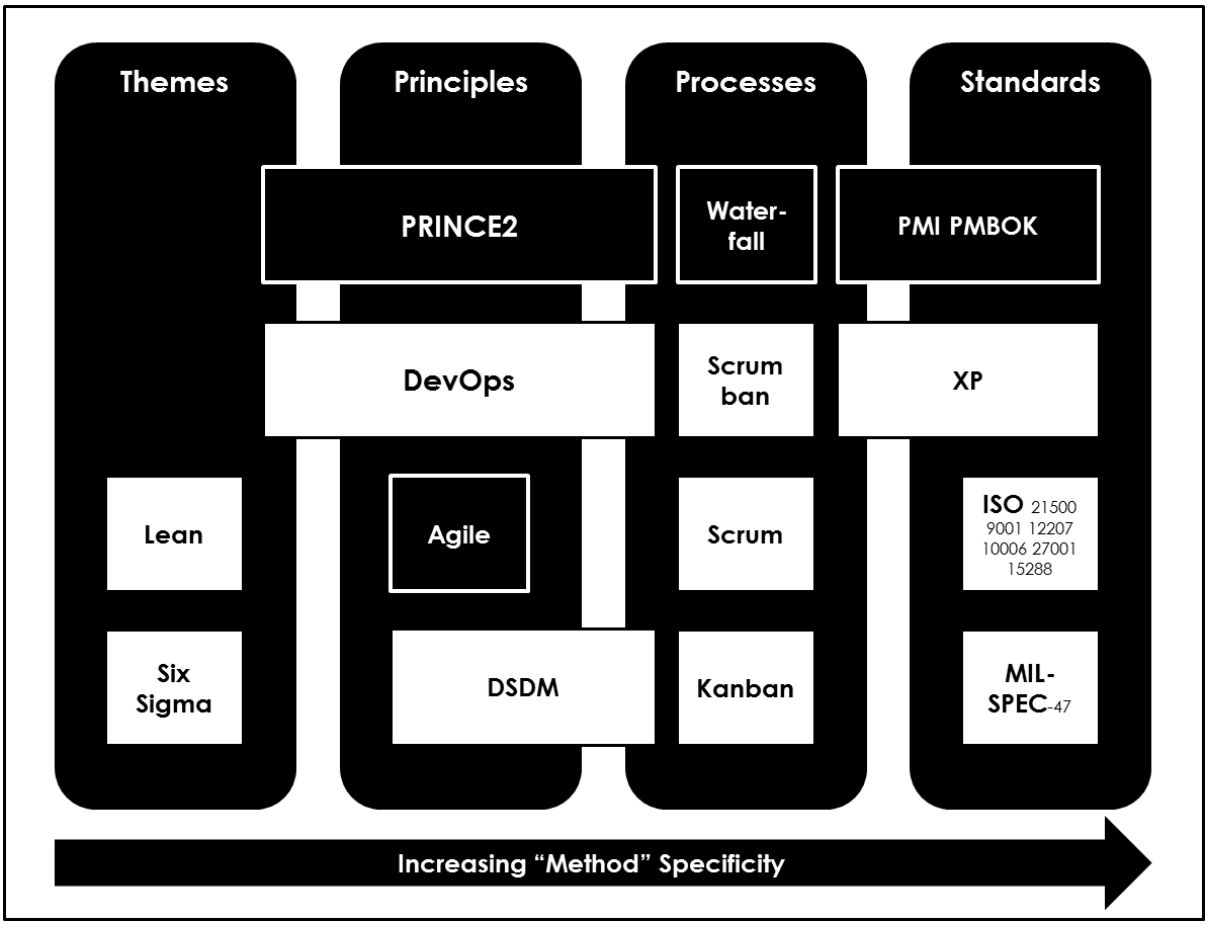


Figure 2.5.3-5: PM Themes, Principles, Processes & Standards, Adapted (Aston, 2021)

Figure 2.5.3-5, first appearing in section 2.3.5 is shown again here. It was taken from thedigitalprojectmanager.com (Aston, 2019) and adapted. While this picture is not accepted as settled fact, it provides a useful perspective. The image was initially used to show how approaches differ in essence and utility. Furthermore, it is now argued that a standard, like the MIL-SPEC-47 codification of items in support of a system, can be maintained while employing a Scrum or a Waterfall process. The standard does not necessarily preclude any process and may rather require reinforcement through hybridisation with processes, principles, and themes. The more complex case probably occurs when hybridizing intra-theme, or -principle, or -process, or -standard.

The next requirement is to propose a means by which integration can be achieved across the delivery of the separate clusters, each locally managed by uniquely hybridized methodologies. In this regard the Network-Arrangement of Project work is described in the next section (2.5.3.1).

The high-level design requirements for the Methodology Comparison Tool & Guide are summarized in Table 2.5.3-1.

Table 2.5.3-1: Methodology Comparison Tool (MCT) & Guide Design Requirements

#	Clustering Design Requirements	What it Produces/Enables	Comment
1	A 'tool' or resource to provide recommendation and information to support the hybridization of the approaches for the clusters. • Store project management methodology & approach (PMM) info that can be accessed. • Enable running of wikis. • Supply recommendation and information supporting selection, tailoring, and hybridization of project management (PM) approaches.	The MCT is a tool that can be used during the hybridization of the project approach – it provides recommendations concerning the choice of the base methodology as well as recommendations on the characteristics of other methodologies that can be combined with the base methodology in order to reinforce it. The guide to the use and application of the MCT is a guide to Selection, Tailoring, and Hybridization.	The MCT addresses Gaps & Issues 3, 6, 7, 8 (Table 2.3.6-2) and the 3rd Research Objective (Table 2.3.6-5). MCT addresses implications specifically implied by the VTSM, like: Identify minimum governance requirements and build into hybridized PM approach. (MCT Design Requirement 3) As was the case with Clustering, the MCT & Guide implies the requirement for a means of enabling integrated delivery – the Network Arrangement addresses this implied requirement.
2	A process or guide to provide recommendation, guidance and information to support the hybridization of the approaches for the clusters. • Guide the selection of the foundational PM approach. • Guide the reinforcement of the foundational PM approach.		
3	Identify minimum governance requirements and build into hybridized PM approach.		

2.5.3.1 Tactical Design Requirements for the Methodology Comparison Tool

Since Methodology Comparison Tool is envisioned, as the name suggests, as a tool, more detailed design requirements are presented for the tool, and for its use in the selection, tailoring and hybridization of project management methodologies and approaches.

For this design and development of the propositions, an approach is followed that is common in SA's major banks' IT project management. First, the problem statement is 'translated' into the strategic design requirements for propositions whereby the problem statement(s) can be addressed (Figure 2.5.3-6).

The strategic design requirement (outlined in this section) is the highest-level description of the proposition, of what utility or product are to be delivered by the proposition, to what end and to who's benefit.

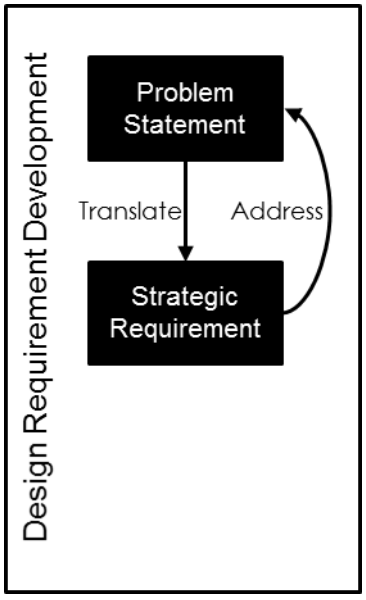


Figure 2.5.3-6: Design Requirement Development (1)

The strategic design requirements contain the information that would typically be found in an early business case document for an SA banking IT project. The strategic design requirements should enable pre-project, low-confidence decision making regarding the potential value, complexity, and size of a project.

The strategic design requirements are through further development translated into tactical design requirements (Figure 2.5.3-7). These are similar to business requirements. The tactical design requirements describe what the commissioner and user of the product or utility expect. The tactical design requirements describe what the product or utility is expected to do for the user, or what it should enable the user to do; and how the commissioner and user expects it to work from a user-perspective.

The tactical design requirements are a 'translation' of the strategic design requirements, and the tactical design requirements deliver on the strategic design requirements, and therefore

enables the problem statement to be addressed (Figure 2.5.3-7: Design Requirement Development (2).

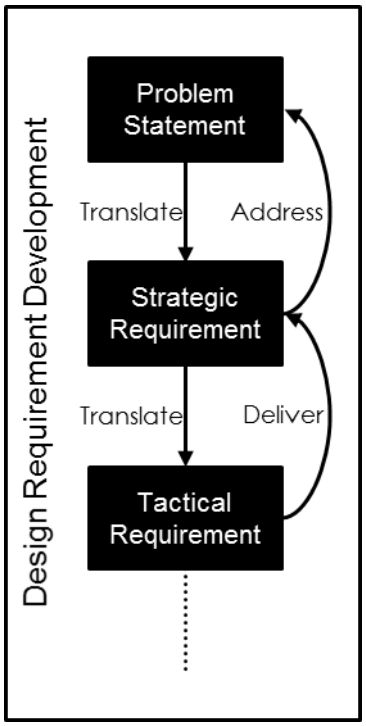


Figure 2.5.3-7: Design Requirement Development (2)

The chapter is concluded by summarizing the concepts as per the developed design requirements, looking forward to the validation of the concepts, and verifying the design requirements against the observations, problem statements, and research objectives.

The strategic, high-level requirement has been stated as a Methodology Comparison Tool that would allow a user to compare methodologies for their characteristics and the management options enabled by these characteristics.

At the strategic level it is also important to explain where the Methodology Comparison Tool is expected to be employed and what the expected value is.

This study being focussed on the IT project management in SA banking, the Methodology Comparison Tool should be usable in this environment as a first priority. Wider applicability could be expected, since:

- Globally-used project management approaches and methodologies are employed in this environment in SA banking IT project management
- Banking IT project management has some common characteristics globally.
- IT project management has some common characteristics globally.

The expected value of the Methodology Comparison Tool lies in the ability to produce information that will be useful during the Selection, Tailoring, and Hybridisation of project management approaches and methodologies and the implementation of changes to the organisational project management methodology and approach. Further to the benefit to

Selection, Tailoring, and Hybridisation, the Methodology Comparison Tool may aid project management methodology and approach knowledge development among project management stakeholders, decreasing dogmatic support for individual project management approaches and methodologies.

The research objective relating to the Methodology Comparison Tool to develop and validate the Methodology Comparison Tool. The question relating to the Methodology Comparison Tool is: how would a Methodology Comparison Tool successfully be developed and validated?

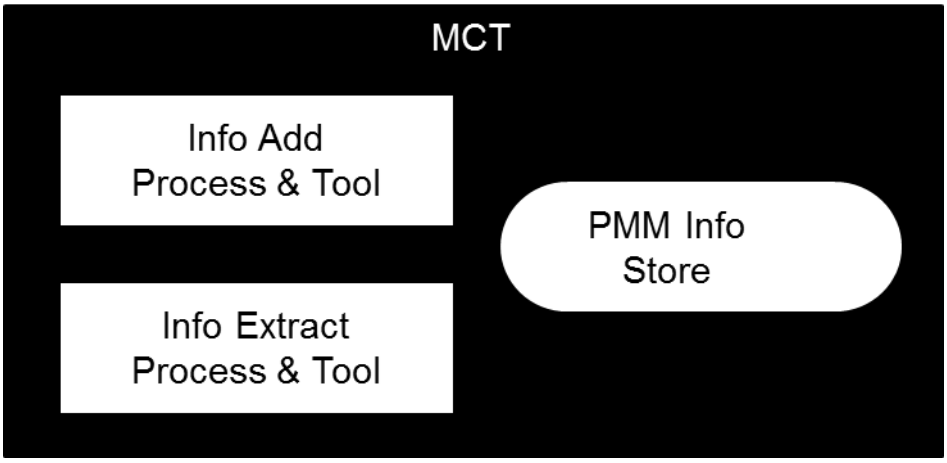


Figure 2.5.3-8: Methodology Comparison Tool high-level components

The Methodology Comparison Tool is required, referring to Figure 2.5.3-8, to cover the following systems and systems-infrastructure aspects:

- To provide a data storage facility, which will be called the project management methodology and approach Library, wherein information relating to project management methodology and approach characteristics can be housed.
- To allow for information relating to project management methodology and approach characteristics to be added to the project management methodology and approach Library and changed under restriction.
- To allow for a search or wiki command to be communicated to the project management methodology and approach Library (unrestricted).
- To allow for information relating to project management methodology and approach characteristics, once requested, to be extracted and read from the project management methodology and approach Library.
- To store and provide information that can be used for Selection, Tailoring, and Hybridisation.

These strategic-level design requirements are summarized in Table 2.5.3-2.

Table 2.5.3-2: Methodology Comparison Tool Strategic Design Requirements

#	**Strategic Design Requirement**
1	Allow the comparison of methodologies, approaches, standards, and guides of PM.
1.1	Enable comparison of characteristics.
1.1.1	Specifically, the management options enabled methodologies, approaches, standards, and guides of PM.
2	Systems & systems-infrastructure aspects.
2.1	A data storage facility, which will be called the PMM Library, wherein information relating to PMM characteristics can be housed.
2.2	Adding of information relating to PMM characteristics to the PMM Library and changed under restriction.
2.3	Search or wiki commands to be communicated to the PMM Library (unrestricted).
2.4	Extraction and reading of information relating to PMM characteristics from the PMM Library.
2.5	Storage and provision of information that can be used for Selection, Tailoring, and Hybridisation.

2.5.3.2 Tactical Design Requirements for Methodology Comparison Tool Guide

The strategic requirement has been stated as a guide for the use and application of the Methodology Comparison Tool, which would be design be a guide to selection, tailoring and hybridization. The guide is aimed at environments wherein the Methodology Comparison Tool is used.

The value of the guide is expected to lie in usability in practice. Whereas theory commonly describes what the outcome of selection, tailoring and hybridization should be, or how it was practiced in studied examples, the proposed guide should describe a process that can be followed or a method that can be applied to new situations.

The research objective relating to the Methodology Comparison Tool Guide is to develop and validate the Methodology Comparison Tool Guide. The question relating to the Methodology Comparison Tool Guide is: How would a Methodology Comparison Tool Guide successfully be developed and validated?

The Methodology Comparison Tool Guide is required to add the following components (Figure 2.5.3-9) and these are summarized in Table 2.5.3-3:

- A Methodology Comparison Tool user guide explaining to the normal end-user how to use the Methodology Comparison Tool.
- A Methodology Comparison Tool administrator guide explaining how to maintain and update the Methodology Comparison Tool.
- A guide that explains how to engage in Selection, Tailoring, and Hybridisation while using the Methodology Comparison Tool.

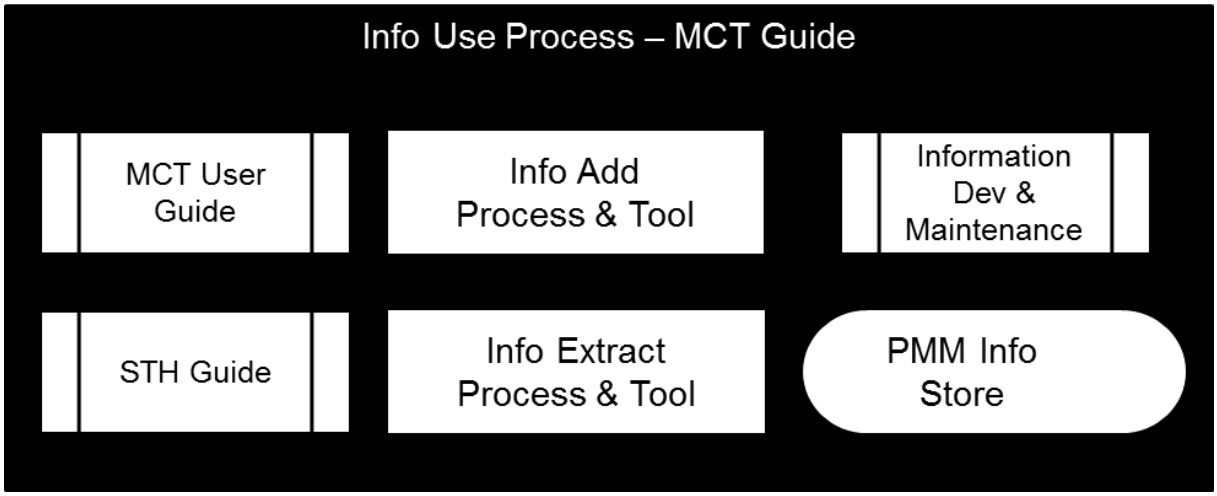


Figure 2.5.3-9: Methodology Comparison Tool & Methodology Comparison Tool Guide

If the Methodology Comparison Tool is to be utilized outside of SA banking IT project management, a 'pro-user' guide should also be created in future.

Table 2.5.3-3: Methodology Comparison Tool Guide strategic design requirements

#	**Strategic Design Requirement**	**Comment**
1	User guide to MCT for end-user.	NA
2	User Guide to the MCT for application to Selection, Tailoring, and Hybridisation.	NA
3	Admin user Guide to the MCT for updating and maintenance.	NA
4	A Pro-user guide.	IT teams in banks are large with full compliments of Project Offices, and the like, to own and maintain tools. A pro-user version and guide would allow the average project practitioner to use the system.

2.5.3.3 Functional Design Requirements for the Methodology Comparison Tool

The strategic, high-level requirement has been stated as a Methodology Comparison Tool that would allow a user to compare methodologies for their characteristics and the management options enabled by these characteristics.

The main tactical design requirements that could deliver the strategic design requirement would include:

- An information housing facility containing the descriptions of project management approaches and methodologies characteristics.
- A convention for the capturing of descriptions of project management approaches and methodologies characteristics in the information housing facility.
- An interfacing system allowing for the searching, requesting and reading of project management methodology and approach characteristics from the information housing facility.
- A convention for the requesting of information from the information housing facility.
- Requirements for the types of characteristics and comparisons that could be valuable inputs to the selection, tailoring and hybridization of project management approaches and methodologies.
- It should go without saying that operating the Methodology Comparison Tool should be intuitive for the user.

Since the storage and interfacing to the stored information present a simple technical need for which vast options are available, the final tactical requirement – relating to the requisite characteristics and comparisons – is treated as the requirement to be prioritized. Convention requirements will also be subject to the prioritized requirement.

The first step in the development of the tactical design requirements (2) is to determine who will use the system and what the user's needs are likely to be.

The methodology comparison tool is being built to offer ease of use, while also supplying the desired level of detail to the user. The tool is activated in one of three ways:

- Run a wiki for a methodology.
- Specify project characteristics and recommended methodologies are provided.
- Specify desired methodology characteristics and recommended ones are provided.

Once a methodology is selected, its characteristics are shown according to its own method. PMBOK, for example, would be viewed according to its process groups or knowledge areas.

These requirements are summarized in Table 2.5.3-4.

Table 2.5.3-4: Methodology Comparison Tool tactical design requirements

#	**Strategic Design Requirement**
1	An information housing facility containing the descriptions of project management approaches and methodologies' (PMM) characteristics.
2	A convention for the capturing of descriptions of PMM characteristics in the information housing facility.
3	An interfacing system allowing for the searching, requesting and reading of PMM characteristics from the information housing facility.
4	A convention for the requesting of information from the information housing facility.
5	Requirements for the types of characteristics and comparisons that could be valuable inputs to the selection, tailoring and hybridization of PMM.
6	It should go without saying that operating the MCT should be intuitive for the user.
7	Run a wiki for a methodology.
8	Specify project characteristics and recommended methodologies are provided.
9	Specify desired methodology characteristics and recommended ones are provided

2.5.3.4 Functional Design Requirements for the Methodology Comparison Tool Guide

The strategic, high-level requirement has been stated as a guide for the use and application of the Methodology Comparison Tool, which would be a guide to selection, tailoring and hybridization by design.

The main tactical components that could deliver the strategic design requirement would include:

- A user guide explaining the navigation of the Methodology Comparison Tool and the outputs that can be generated.
- A step-by-step guide for selection, tailoring, and hybridization; and the application of the Methodology Comparison Tool at each of the steps.
- A method (for the selection, tailoring, and hybridization of project management approaches and methodologies in conjunction with the Methodology Comparison Tool)

sufficiently clear and lean to enable Selection, Tailoring, and Hybridisation for individual projects.

For the tactical design requirements (2) more detail is delved into. For a firm delivering simple, standalone projects, a bottom-up approach to developing a project management methodology and approach may be suitable. However, for the large firm and complex projects, it is argued that a top-down approach, that makes provision for the requirements of the broader organisation, would be superior.

The first step is to identify the potentially non-negotiable requirements that the project environment, the rest of the organisation and external stakeholders, such as regulators, have with regards to project management. The second step is to categorise the different levels at which separable parts of the project may exist within the organisation and with relation to external partners or clients of the project and to confirm which of the potentially non-negotiable requirements are confined to individual levels. Then a maximum complexity process may be developed for each level that may produce a discrete part of the project.

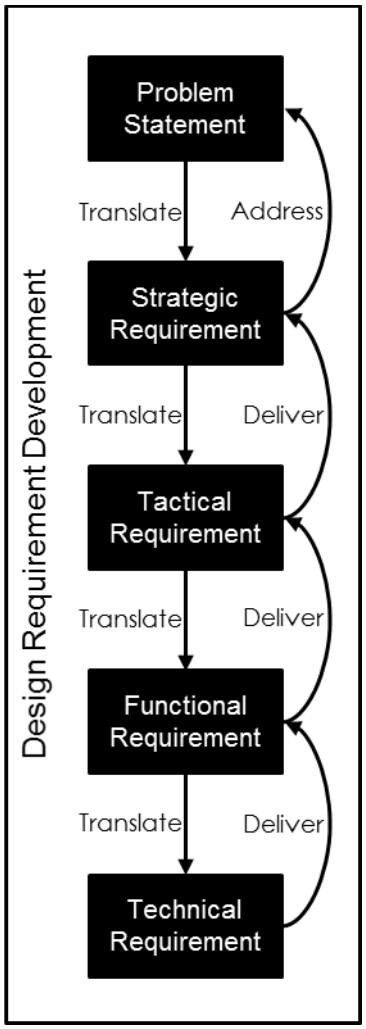


Figure 2.5.3-10: From Problem Statement to Technical Requirement

The maximum complexity process is built by choosing a base methodology that best caters to the level's potentially non-negotiable requirements, enforced by unique, desired and mutually inclusive characteristics of other methodologies. Going a level down (more

detailed): for each individual, particular project, non-value adding steps may be cut from the process, until the process can be said to be lean. Lean meaning: as much as needed, as little as possible. Going a level up (less detail, high-level view): the organisation holds project management to a simple standard, that caters for its prioritised overall requirements (like procurement standards, financial reporting standards, business case review, etc.), but leaves room for the project and each sub-project to devise an optimal project management methodology and approach for delivery.

If the design requirement process is assumed as illustrated in Figure 2.5.3-10, it can be stated that functional design requirements had been delivered at a fairly high level. In order to construct a production version of the Methodology Comparison Tool and Guide, the functional requirements will have to be expanded on and then further developed into technical design requirements.

With regards to the scope and constraints of the research study, the design requirements will not be developed further, and the functional requirements are summarized in Table 2.5.3-5.

Table 2.5.3-5: Methodology Comparison Tool Guide Functional design requirements

#	**Functional Design Requirement**
1	Specify desired methodology characteristics and recommended ones are provided.
2	A user guide explaining the navigation of the MCT and the outputs that can be generated.
3	A step-by-step guide for selection, tailoring, and hybridization; and the application of the MCT at each of the steps.

2.5.4 Design Requirements for the Network Arrangement of Project Work

The Network-Arrangement of project work is utilized to tie the Multi-Methodology System together.

The project is expected to report periodically to the project office (Figure 2.5.4-1), or whichever entity owns the organization’s project governance. Some projects may similarly be required to report periodically to internal compliance or external regulators.

The argument in favour of a reactive Multi-Methodology System instead of a predetermined project management approach is that the project is mainly required to deliver information to project governance, compliance, and the regulators. If the temporary organization can commit to delivering, and actually deliver, the agreed information as and when stipulated,

the internal management of the project should not be of concern to project governance or compliance.

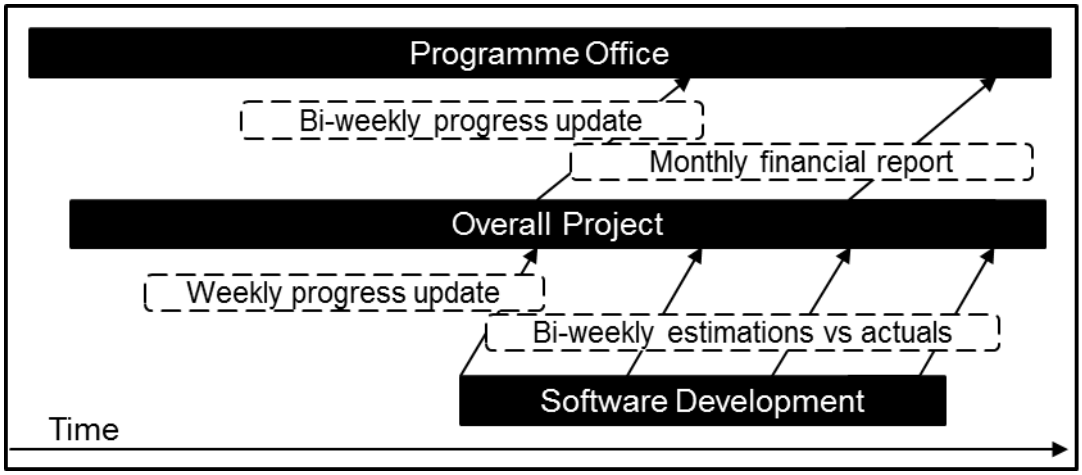


Figure 2.5.4-1: Network Arrangement - Updates from the Project to the Project Office

Furthermore, the project needs to accept allocated resources at an agreed point in time, utilize these resources, and release the resources at an agreed time (Figure 2.5.4-2). The project will also take certain artefacts at a certain point, and is expected release changed or new artefacts at future agreed upon point in time. Again, the internal management of the project is not of importance extra-project actors, all that is important is that the flow is adequate and that the quality of the artefacts delivered by the project is satisfactory. It happens too often that quality assurance focusses on monitoring a process, when those who practice quality assurance has little to no knowledge of that which constitutes adequate quality as it pertains to the artefact.

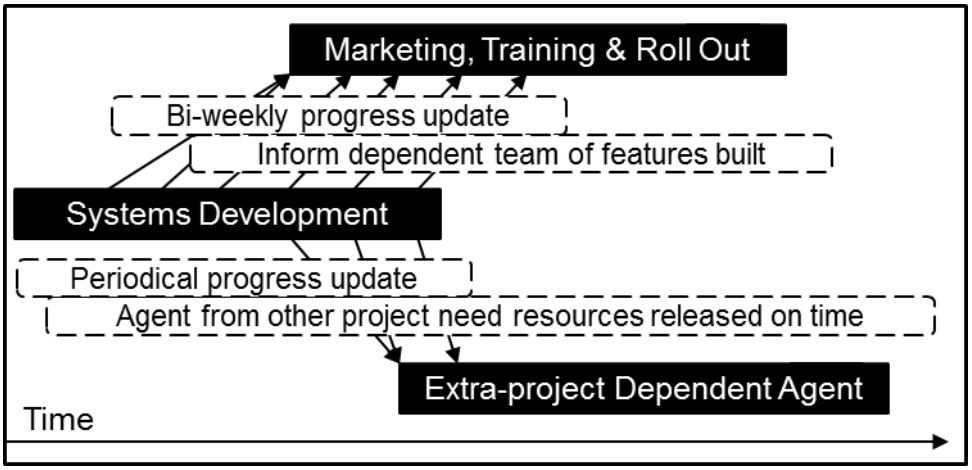


Figure 2.5.4-2: Network Arrangement - Intra-Project Updates

Similarly, the constituent clusters of the project are required to deliver information to the project management function, but as long as the clusters deliver according to plan, the project management function does not need to interfere with the management as practiced by the team lead.

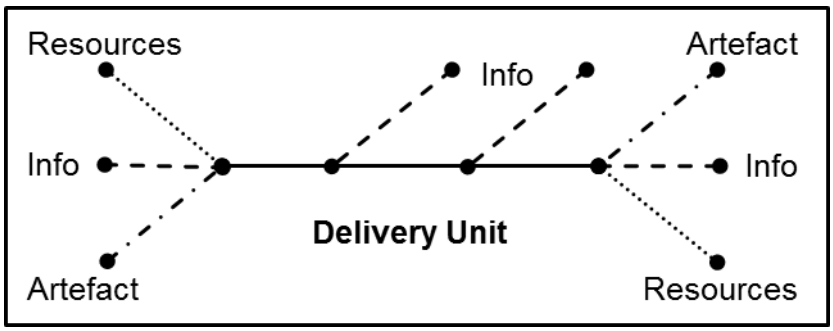


Figure 2.5.4-3: Network Arrangement of Delivery Units

Eventually, at the Delivery Unit level, the Delivery Units are connected in a network stipulating the flow of resources, information and artefacts (Figure 2.5.4-3). The Network-Arrangement of projects down to the level of the Delivery Units can provide a real-time view on project, and portfolio-wide, progress and dependency risks.

Again, it argued that this is not a novel description of project delivery as much as it simply seeks to formalize the natural form that project delivery takes.

The design requirements for the Network Arrangement of Project Work are summarized in Table 2.5.4-1.

Table 2.5.4-1: Network Arrangement of Project Work Design Requirements

#	**Network Arrangement Design Requirements**	**What it Produces/Enables**	**Comment**
1	Enable the integrated delivery of the System 1 components of the project. • Determine the means by which clusters and delivery units can be connected.	The network arrangement of project work connects delivery units and clusters by means of 'hard points' where specified exchange of information, resources, and artefacts can be monitored.	The Clustering of Project Work addresses Gaps & Issues 5, 6, 7, 11 (Table 2.3.6-2) and the 2nd Research Objective (Table 2.3.6-5). Clustering addresses implications specifically implied by the VTSM, Clustering, and the MCT, like: The means of enabling integrated delivery over disparate System 1 components/clusters following unique methodologies.
2	Determine the characteristics of the connections between delivery units and clusters.		
3	Provide an intra- and inter-project dependency view of delivery.		

2.5.5 Multi-Methodology System Design Architecture

In the last two sections, before the conclusion to the chapter, two holistic pictures are created. In this section the development of the proposition from the problem statements to requirements to a one-pager diagram of the Multi-Methodology System is illustrated. This illustration is an attempt to explain the characteristics of the eventual outcome.

Table 2.5.5-1: Gap/Issue/Directive/State with Systems Thinking Criticism

#	Gap/Issue/Directive/State
1	Agile not outperforming Traditional in all aspects.
2	Assess before & after PM approach change.
3	PM approach dogmatism.
4	Empirical work demands theoretical work.
5	Next step: project-specific PM approach.
6	Practical aspects of tailoring & hybridization.
7	PMI's call for tailoring & hybridization research.
8	Aid for the comparison of project management approaches.
9	Repurpose ITIL implementation success factors.
10	Nuanced PM approach for highly complex SA banking IT.
11	Systems Thinking criticisms of PM approaches.
11.1	Requisite Variety.
11.2	Adaptability & Localized Management.
11.3	Optimized Control.

Table 2.5.5-1 outlines the issues that could benefit from investigation. Of these identified issues, the priority was to apply Systems Thinking Principles to the development of an improved approach (the Multi-Methodology System) to IT project management in SA banking.

Issues numbered 3-8 are also addressed as externalities to executing the priority.

Figure 2.5.5-1 illustrates the derivation of the problem statement for the study from the identified issues (Table 2.5.5-1) and Figure 2.5.5-2 illustrates the development from there to the propositions and design requirements. The problem statement very closely links to the identified issues. The great difference arises when the research questions for the study are chosen. The study can't be *all things unto all men*, and only prioritized problems, which was assumed to be addressable through proposition design and validation, were translated into research questions.

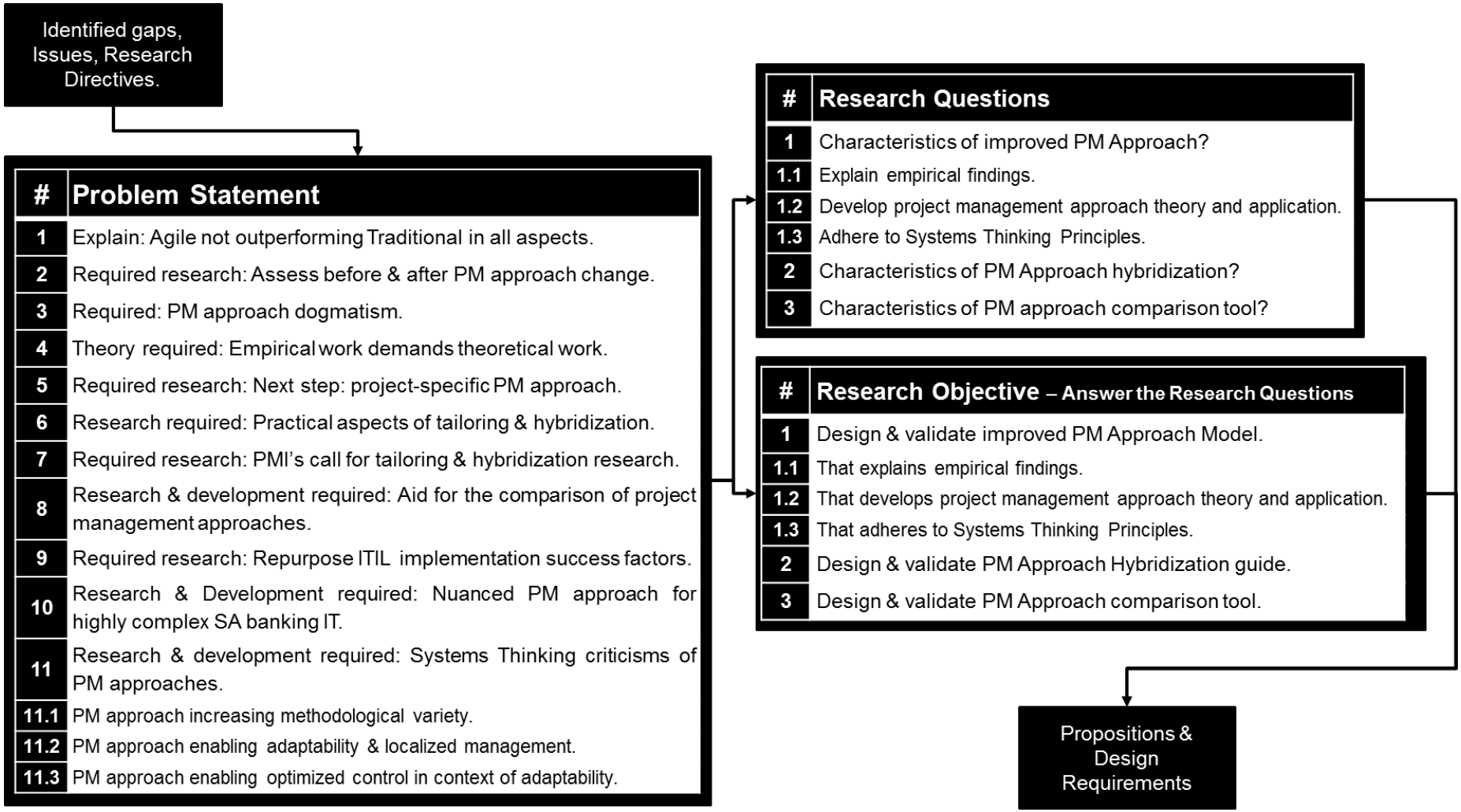


Figure 2.5.5-1: Problem Statements to Research Questions & Research Objectives

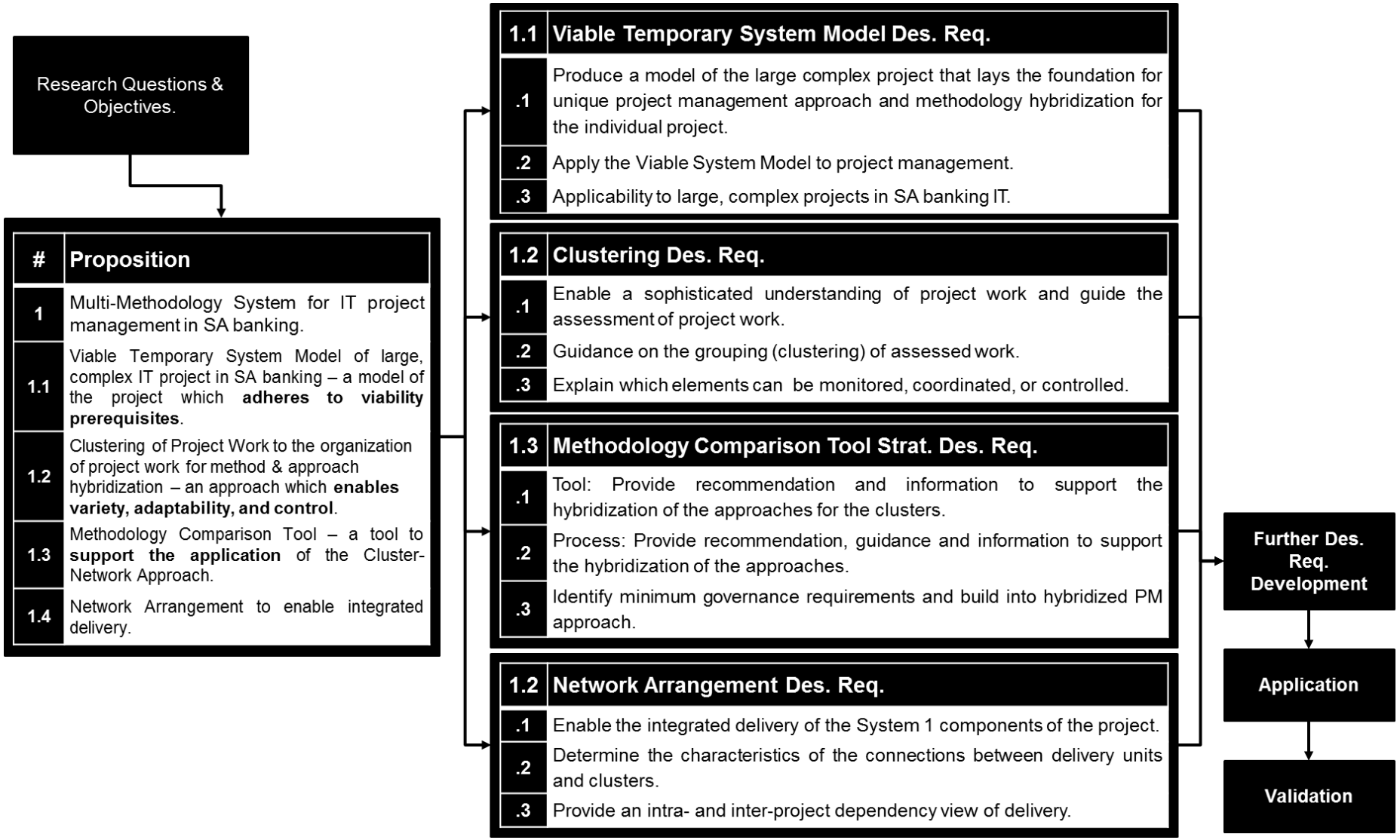


Figure 2.5.5-2: Propositions & Design Requirements

The research objectives for the study related to the creation and execution of means to addressing the research questions. In summary, whereas a myriad of investigable issues was identified, the execution of this study committed to deliver on the research objectives.

In order to enable delivering on the research objectives of the study, propositions were designed and validated.

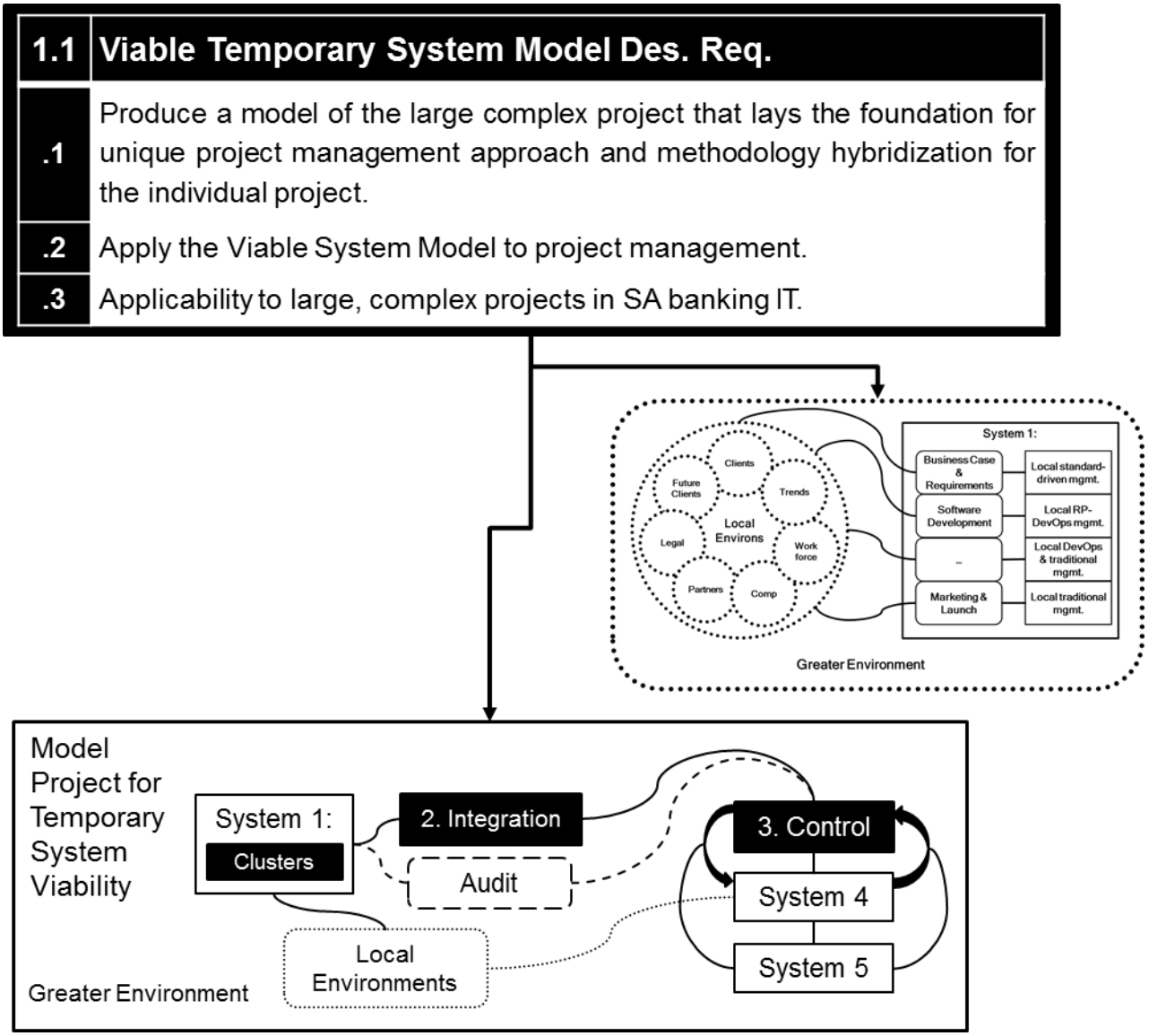


Figure 2.5.5-3: Viable Temporary System Model Traced to Design Requirement

Figure 2.5.5-2 illustrates, at a very high-level, the proposition (the Multi-Methodology System) broken down into its constituent components, and the very high-level descriptions of the need that each of the components respond to are provided.

High-level design requirements are tabled for each one of the components. These could be referred to as the strategic design requirements addressed by the components. And, some of the components were described in further detail in this chapter. The architectural development should be apparent: the components make up the greater propositions, the proposition follows from the research objective, the research objective concerns addressing

the research questions, the research questions relate to problem statements for which investigation could be feasibly formulated within the scope of this research study.

The Viable Temporary System Model was created in response to the need for a model of the project that adheres to Systems Thinking principles. The VSM, a model falling under the auspices of Systems Thinking, was applied to the project, to create the Viable Temporary System Model (Figure 2.5.5-3).

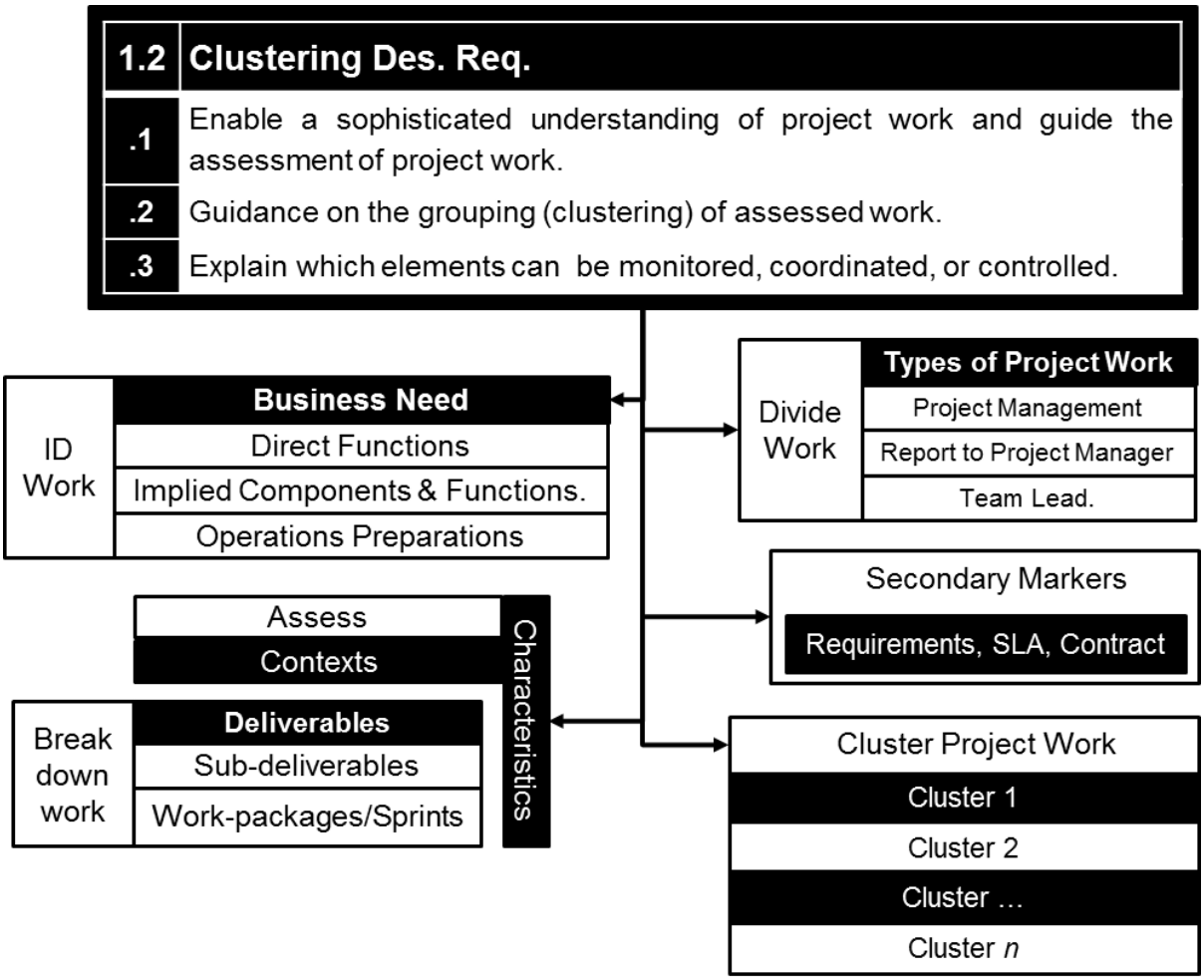


Figure 2.5.5-4: Clustering of Project Work Traced to Design Requirement

The Viable Temporary System Model provides a solution from the same direction where from the criticism of project management approaches came. The VSM presented a model of the organization which is more nuanced that that found in formalized project management approaches and bodies of knowledge. In doing so, the Viable Temporary System model not only lays the foundation for the Multi-Methodology System, but also responds to problem statements 4 & 5 – the richness of the VSM (and the derived Viable Temporary System Model) explains so of the current empirical findings and presents a next step in the evolution of project management approach theory.

Specifically, as illustrated in Figure 2.5.5-3, a setup of the project allowing for the use of multiple methodologies on a single project enabled, and the setup of the greater project

delivering organization is illustrated in a way that allows for greater autonomy and scalability for the individual project and organisation as a whole.

The Clustering of Project Work (Figure 2.5.5-4) responds directly to the design requirements and is a practical application that can be traced back and described as a practical application of the Systems Thinking Principles highlighted in Figure 2.5.5-1.

Further to responding to its stated design requirements and the execution of the research objective, the clustering of project does address problem statements 6 and 7 as externalities.

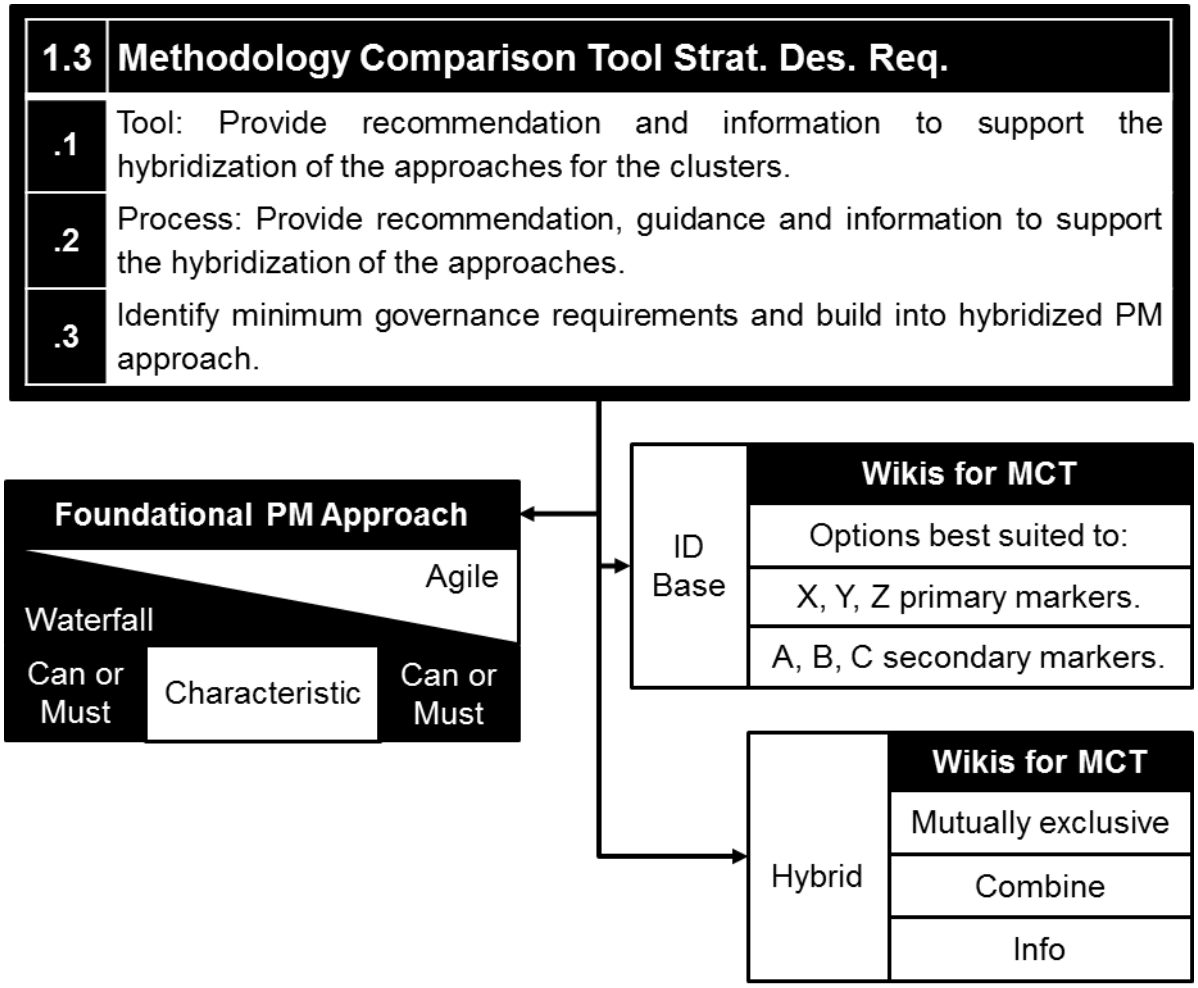


Figure 2.5.5-5: Methodology Comparison Tool & Guide Traced to Design Requirements

The Clustering of Project Work is a result of choice circumstance – in order to plan the delivery of project work by any means, the work has to be assessed and understood as well as possible. The Clustering of Project Work is therefore driven from an assessment-input perspective.

The Methodology Comparison Tool and Guide (Figure 2.5.5-5) are the most practical-application focused components of the Multi-Methodology System. The tool provides information as input for selection, tailoring, and hybridization; and the 'Guide' for the application therefor is a *de facto* selection, tailoring and hybridization guide.

The Methodology Comparison Tool and Guide does not only deliver a key component of the Multi-Methodology System, but also relates to issues that were identified very early on in the research: that there was a lack of formalized practical guidance regarding tailoring, and no formalized means of comparing approaches to and methodologies of project management.

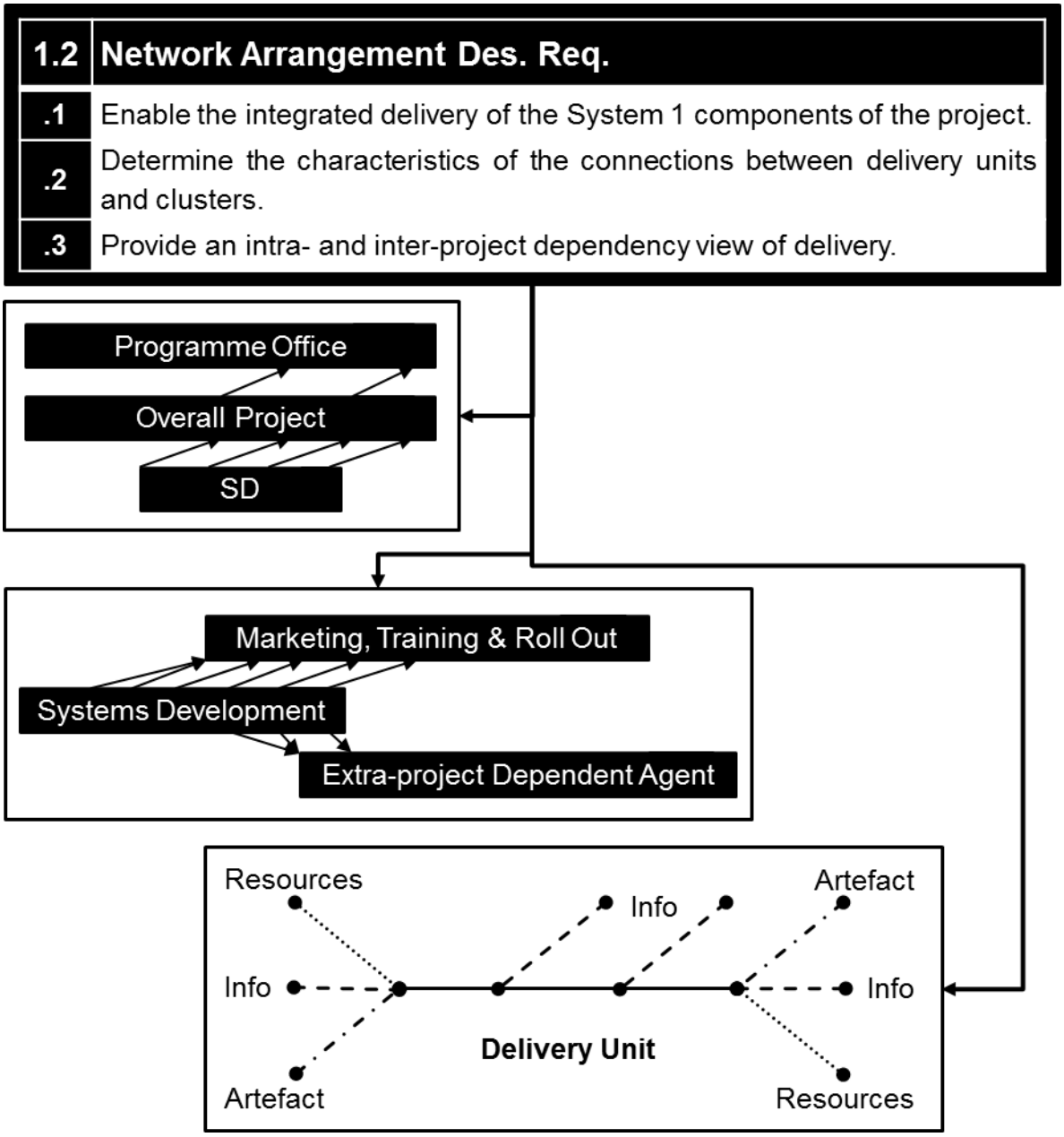


Figure 2.5.5-6: Design Requirement Traced to Network Arrangement

Therefore, apart from delivering on the proposition and addressing the Systems Thinking issues, problem statement 3, 6-8 are also addressed.

Lastly, the Network Arrangement (Figure 2.5.5-6) delivers on the requirement of enabling integrated delivery whilst providing for local management and adaptability. This also responds to problem statements 6 and 7, and further addressed the question: how should minimum governance be approached?

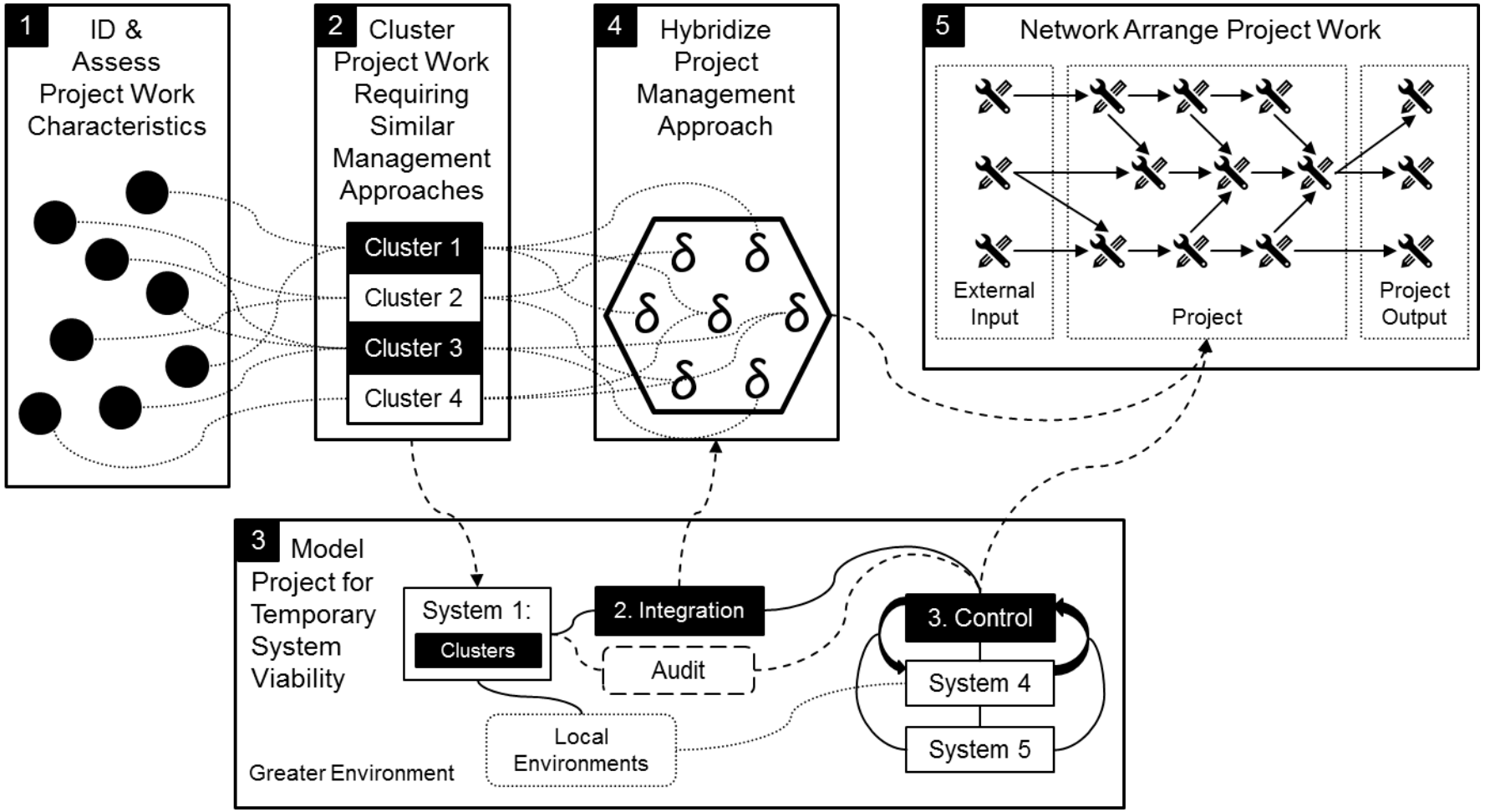


Figure 2.5.5-7: The Complete, High-Level Multi-Methodology System

The Network arrangement addresses the question of minimum by identifying the items of delivery that can be tracked, and the locations at which monitoring can occur: the interfaces between ‘Delivery Unit’.

All put together, the Multi-Methodology System (Figure 2.5.5-7) emerges.

2.5.6 The Workings of the Methodology Comparison Tool as a Framework

Following the description of the design architecture in section 2.5.5 and the design requirements for the Methodology Comparison Tool & Guide in section 2.5.3, the envisioned workings of the tool and guide as a framework is now explained.

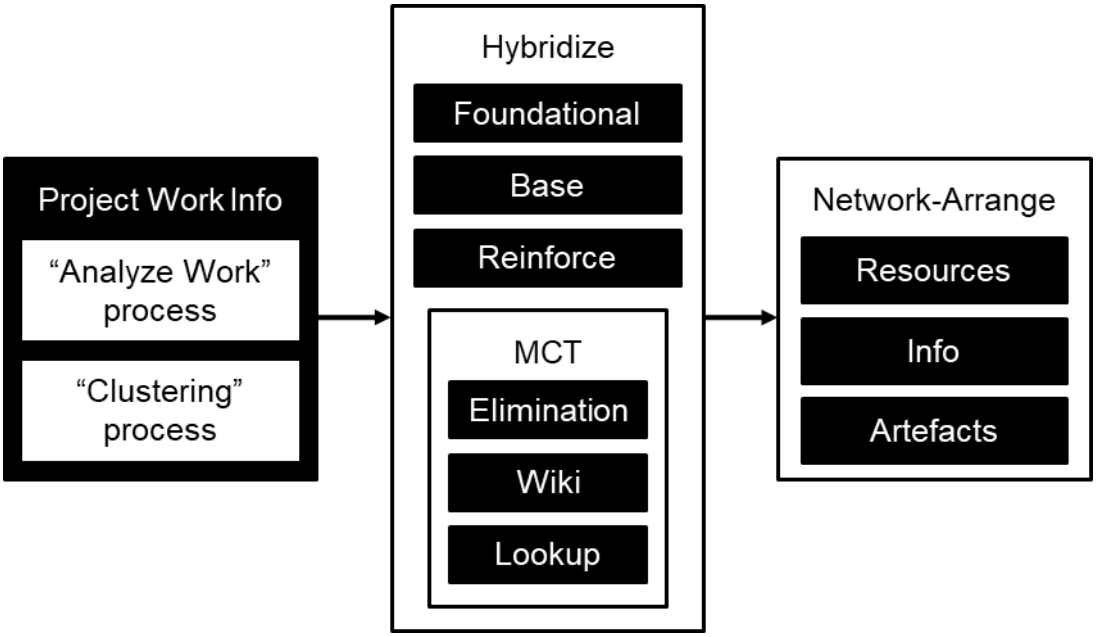


Figure 2.5.6-1: MCT Hybridization at a High Level

The identification and assessment of project work, and the clustering of project work are the first two processes illustrated in the diagram (Figure 2.5.5-7) for the Multi-Methodology System and the information generated during these processes serves as the enabling input for the hybridization (Figure 2.5.6-1) executed by utilising the Methodology Comparison Tool & Guide.

The identification and assessment of project work focus on the requirements relating to the product to be delivered by the project. The information relating to the requirements which is delivered by this identification and assessment of project work will hopefully enable some questions (illustrated in Figure 2.5.6-2) to be addressed. After addressing these questions, the foundational project management approach may be determinable.

It is proposed that the responses to these questions would indicate a strong argument in favour of either agile or waterfall approaches. For instance, if it is assumed impossible to fix the requirements, and scope by extension, before an ‘execution’ or ‘build’ stage, then agile an agile approach would be fit and a waterfall approach would be risky. If, as another

example, an ‘implication explosion’ is expected at some point – this refers to a point beyond which resource requirements increase exponentially – then a stage gated waterfall approach would be fit and an agile approach would be risky. Where both the first and second example is contained in the same occurrence, a hybrid approach would be a fit and a non-hybrid approach would be risky.

1	Foundational PM Approach	
Yes Linear/Waterfall/Traditional		Agile/Reiterative No
Can	Can requirements be determined before execution?	Must
Must	Is a requirement-implication explosion expected to occur at some point?	Can
Must	Are requirements inflexible?	Can
Can	Is direct client-involvement not necessary, or not possible for the execution of this work?	Must
Must	Are there minimum requirement linear dependencies within this deliverable?	Can

Figure 2.5.6-2: Questions Regarding the Determining the Foundational PM Approach

Building the questions listed in Figure 2.5.6-2 into a framework, would yield decision paths like those illustrated in Figure 2.5.6-3 and Figure 2.5.6-4.

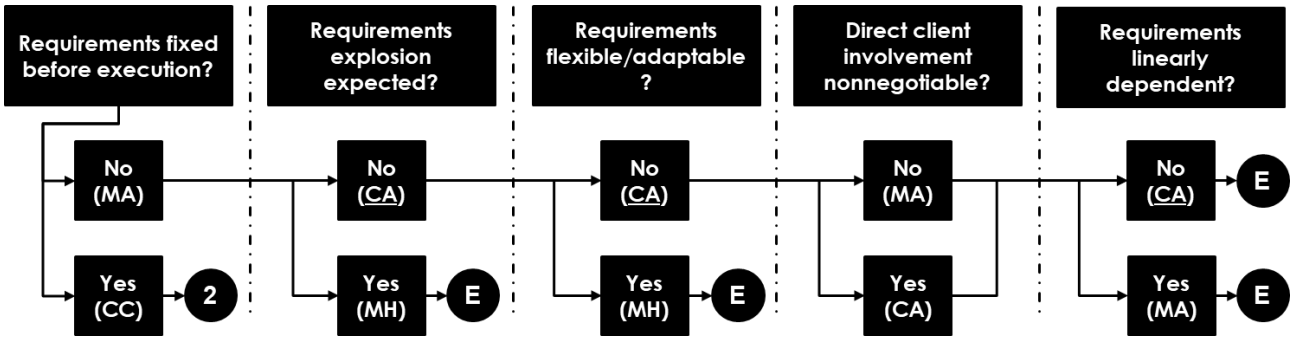


Figure 2.5.6-3: (1) Methodology Comparison Tool 'No' Stream

The decisions have the following outcomes:

- ‘Must Agile’ (MA) for a characteristic that demands an agile project management approach.
- ‘Can Agile’ (CA) for a characteristic that does not preclude an agile project management approach.
- ‘Must Waterfall (MW) for a characteristic that demands a waterfall project management approach.
- ‘Can Agile’ (CW) for a characteristic that does not preclude a waterfall project management approach.

- ‘Can Agile or Waterfall (CC) for a characteristic that does not preclude agile or waterfall project management approaches.
- ‘Must Hybrid’ (MH) for a series of characteristics demanding both agile and waterfall project management approaches.

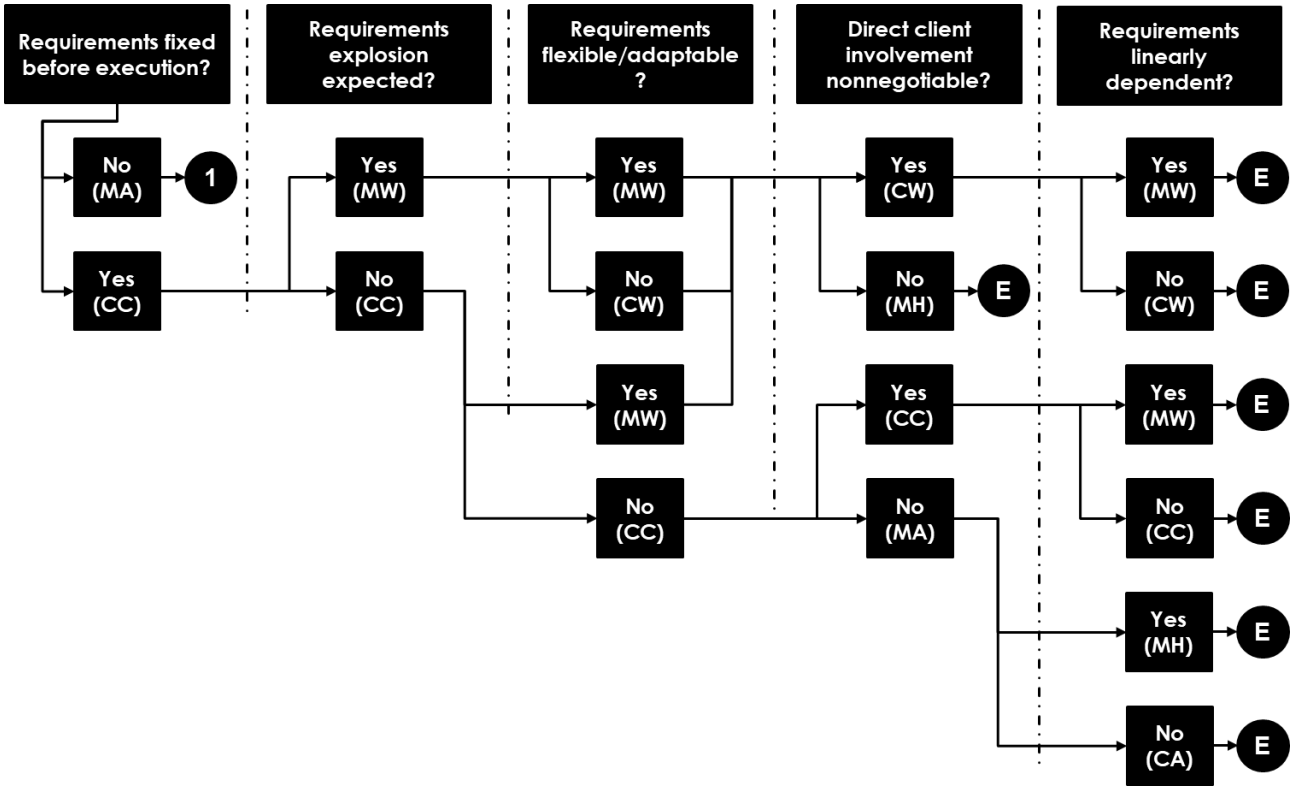


Figure 2.5.6-4: (2) Methodology Comparison Tool 'Yes' Stream

Observing the decision paths, it is noticeable that ‘Must Hybrid’ is the most numerous end-node (‘E’ represent an end-node in Figure 2.5.6-3 and Figure 2.5.6-4). Hybrid is also not precluded in theory by any of the other paths and resultant end-nodes. The five questions and the approach documented here illustrates a rationale and is not presented as definitive, however, it does offer a theoretical explanation of the move towards hybrid and mixed methods (Tansley, Huang and Foster, 2013; Komus, 2014, 2017, 2020; Kuhrmann *et al.*, 2016; Vijayasarathy and Butler, 2016b; Ko and Kirsch, 2017; Komus and Kuberg, 2020), and supports the notion that hybrid is not a stepping stone project management approach (Marinho *et al.*, 2019; Gemino, Horner Reich and Serrador, 2021).

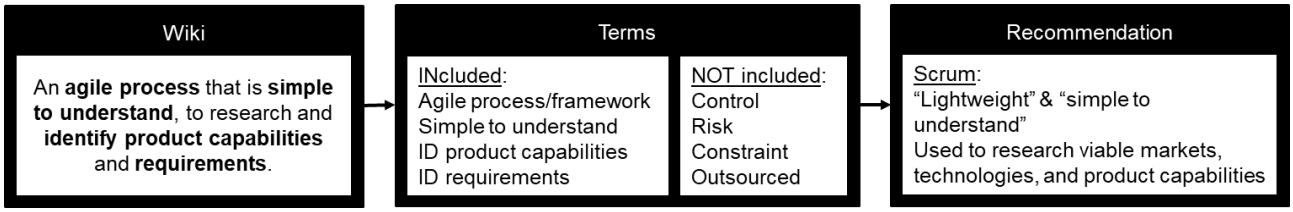


Figure 2.5.6-5: Methodology Comparison Tool Wiki for Methodology Recommendation

The Methodology Comparison Tool produces a recommendation for a foundational project management approach for the overall project. For example, if the first question was answered ‘No’ and the second ‘Yes’, it would be recommended that an agile project would

first be undertaken with the goal of producing the requirements for the greater, envisioned deliverable.

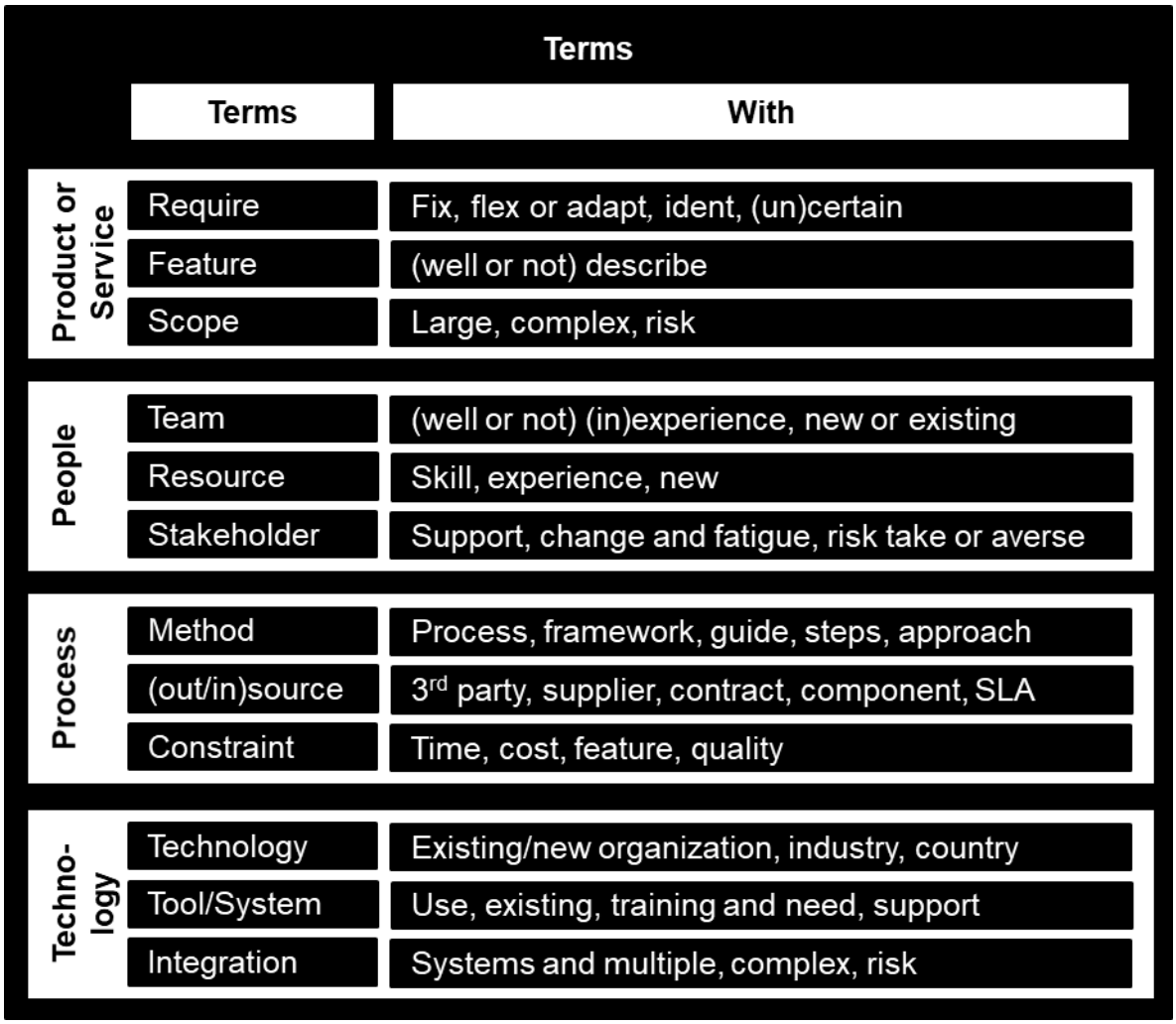


Figure 2.5.6-6: Keyword or Term Example for MCT Wikis

To obtain a recommended agile methodology, the Methodology Comparison Tool shall enable a keyword or term-based wiki to be run and responded to (Figure 2.5.6-5). For the example of an agile requirements stage, the keywords match the characteristics of scrum (Axelos, 2018).

Figure 2.5.6-6 is a Product-People-Process-Technology example of wiki-enabling keywords and -terms, to produce an output as in Figure 2.5.6-5.

If the initiative is continued after the requirements had been analysed, a stage gated process – linearly dependent – and *de facto* waterfall approach had been taken at the highest level – an example of which could be as illustrated in Figure 2.5.6-7. Having already applied principles of waterfall and agile together, this is a hybrid approach to project management. It is proposed that the question should never be whether project management should follow a waterfall or agile or hybrid approach.

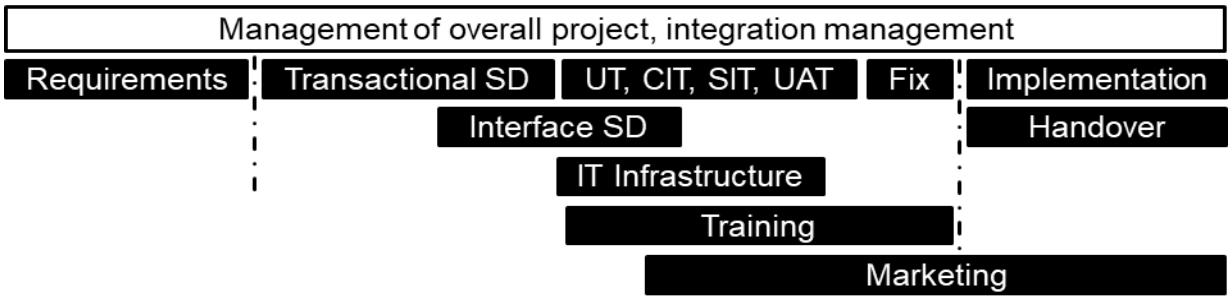


Figure 2.5.6-7: Project Clusters of Work Example

Rather, the management of (especially) the large, complex project should always be approached with hybrid and/or mixed methods. At the highest level of project management and the integration of the delivery, the large, complex project inevitably takes a waterfall shape, whereas the delivery of individual components may benefit from greater agility. The assemblage of these approaches into a singled macro initiative necessitates hybridization and gives shape to the Multi-Methodology System.

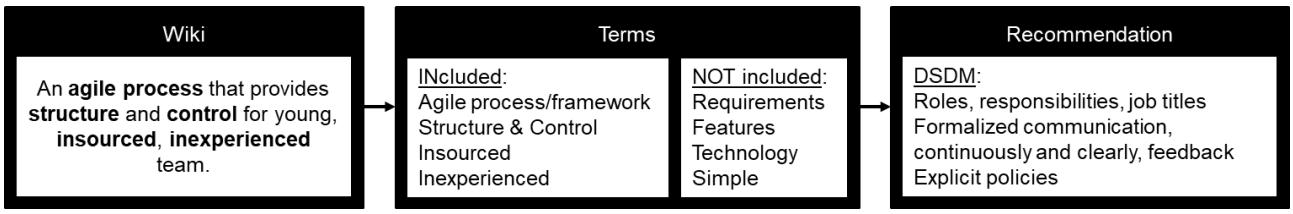


Figure 2.5.6-8: Another Example of an MCT Wiki for Methodology Recommendation

Figure 2.5.6-8 represents another example of an MCT wiki recommending a methodology, this time DSDM agile for the, as a continuation of the example, interface systems development.

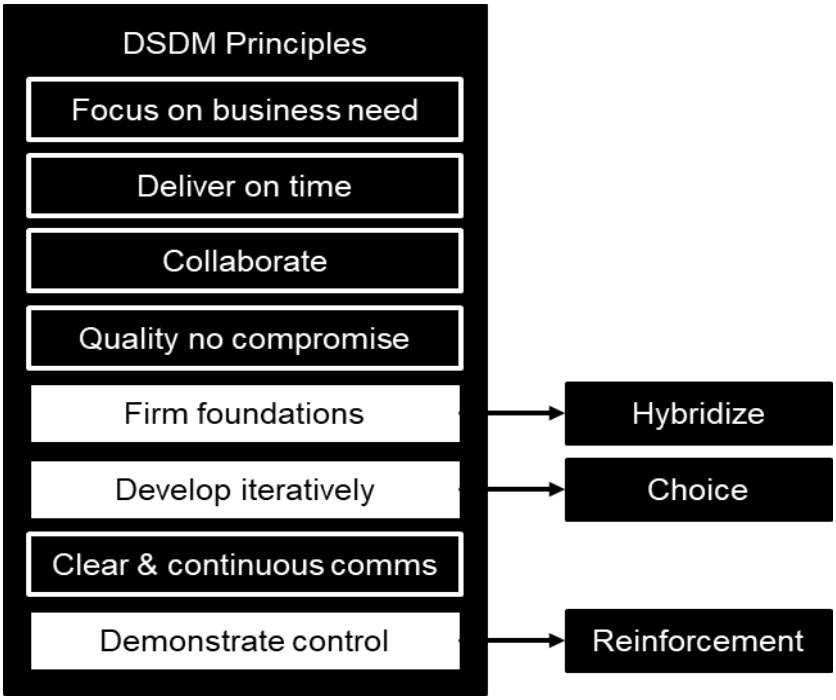


Figure 2.5.6-9: The Need to Hybridize as Reinforcement

The need for hybridization as a reinforcement to a recommended and subsequently selected methodology is described with reference to Figure 2.5.6-9., which lists the principles of DSDM (Axelos, 2018). When any of the core principles cannot be adhered to, DSDM agile delivery is at risk. A deficiency in the “Demonstration of Control” may be reinforced for by applying a standard to service level agreement formulation as described by ISO.

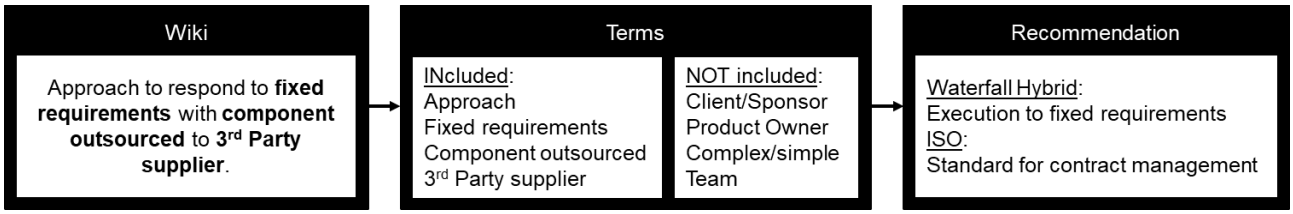


Figure 2.5.6-10: MCT Wiki Recommends Hybrid

However, when iterative development is not possible, a different choice in approach and methodology is required. As a midway between these two situations, iterative development from firm foundations may be achieved by hybridizing the DSDM base methodology with a methodology that more directly guides the establishment of the firm foundation for iterative development by hybridizing DSDM and stage-gated approval of delivered components.

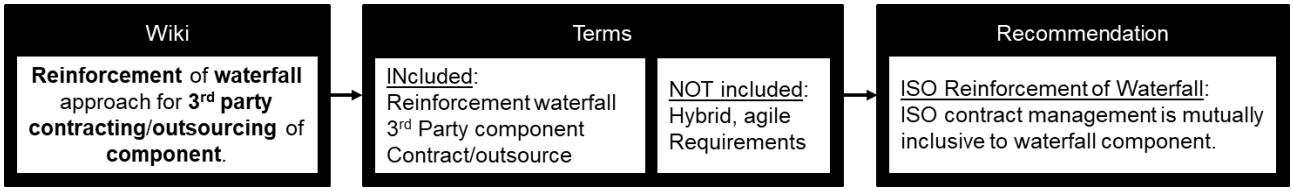


Figure 2.5.6-11: MCT Reinforcement Wiki

Figure 2.5.6-10 is an example of a Methodology Comparison Tool wiki recommending a hybrid methodology for the IT infrastructure component of the example project (Figure 2.5.6-7).

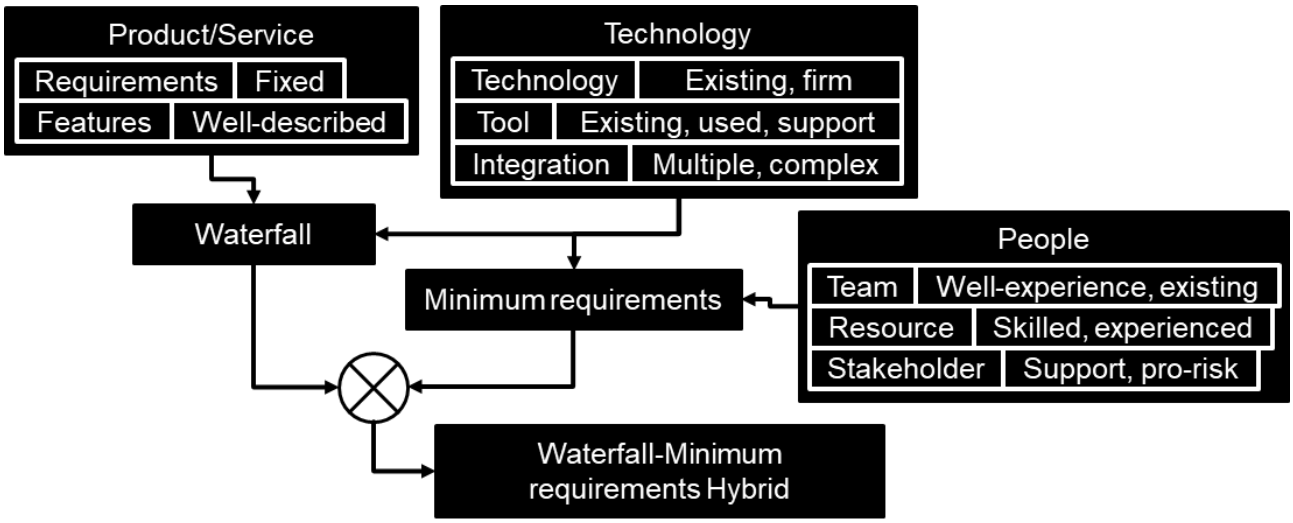


Figure 2.5.6-12: MCT Recommendation following Reinforcement Wiki

Figure 2.5.6-11 is an example of a Methodology Comparison Tool reinforcement wiki recommending a hybrid methodology for the IT infrastructure component of the example project (Figure 2.5.6-7).

Refer to the transactional systems development seen in the high-level view of a fictional project, illustrated in Figure 2.5.6-7. In this example, the transactional systems development portion of the project follows an agile phase for which the goal was to deliver well-analysed requirements. Figure 2.5.6-12 illustrates a wiki submitted to the Methodology Comparison Tool recommending waterfall as a response to identifying strong waterfall indicators – 'fixed requirements' and 'well-described features' – from the input. The people-characteristics mentioned in the wiki indicates that the team should be able to complete the work with the minimum oversight, since they are experienced and skilled. The technology aspects similarly indicates that the technology and tools are not new, are used and supported. The risk associated with integration over multiple systems prompts the recommendation to be a waterfall and minimum requirements hybrid approach to the management of the transactional systems development.

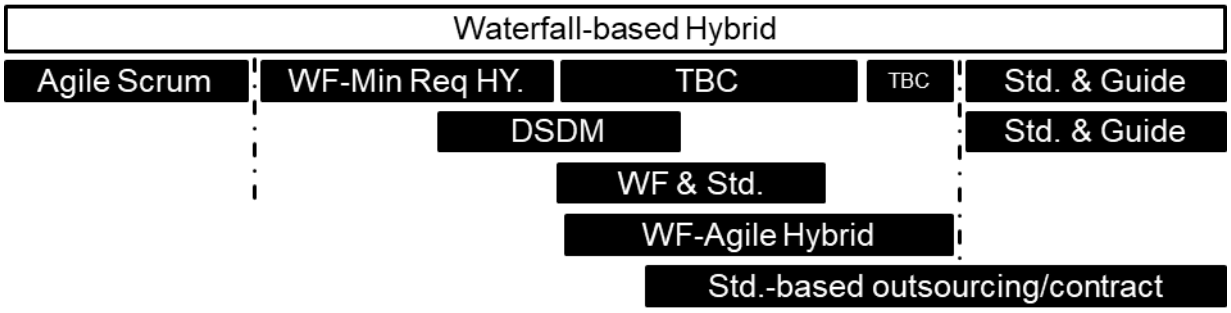


Figure 2.5.6-13: Project Clusters of Work Example Hybridised & MMS

Although this section is concerned with the workings of the Methodology Comparison Tool & Guide, the project management minded reader would see Figure 2.5.6-7 turning into a Multi-Methodology System, similar to Figure 2.5.6-13. And, inevitably, the reader would contemplate the exercise of control and integration in such a situation.

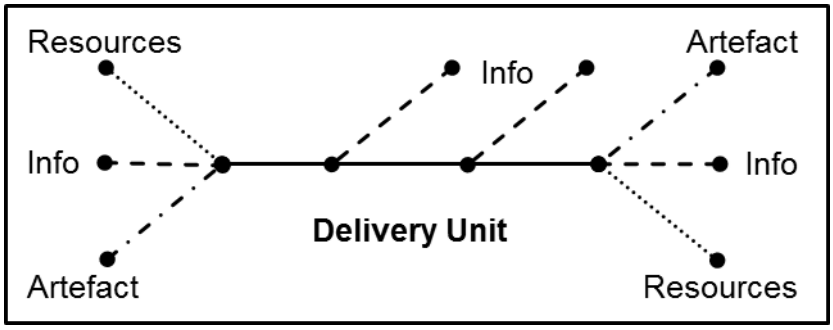


Figure 2.5.6-14: Network Arrangement of Delivery Units

Following form the requirements stated for the Network-Arrangement of Project Work (section 2.5.4), the rationale is that the delivery units interface intra- and inter-project, and that resources, information, and artefacts are expected to be transferred at the interfaces (Figure 2.5.6-14). It is then argued that the requirements for successful interfacing should

form the foundation for the establishment of the minimum governance requirements for a project.

In the hybridisation process, illustrated in Figure 2.5.6-15, the clustering and assessment of project work, which preceded the hybridisation, provide the necessary information regarding the project work and the organisation to commence with hybridisation.

After proposing a foundational project management approach for the greater project, at the project management level, the minimum governance requirements are determined. This is the point at which the transfer of information, resources, and artefacts through the interfaces between delivery units should be established.

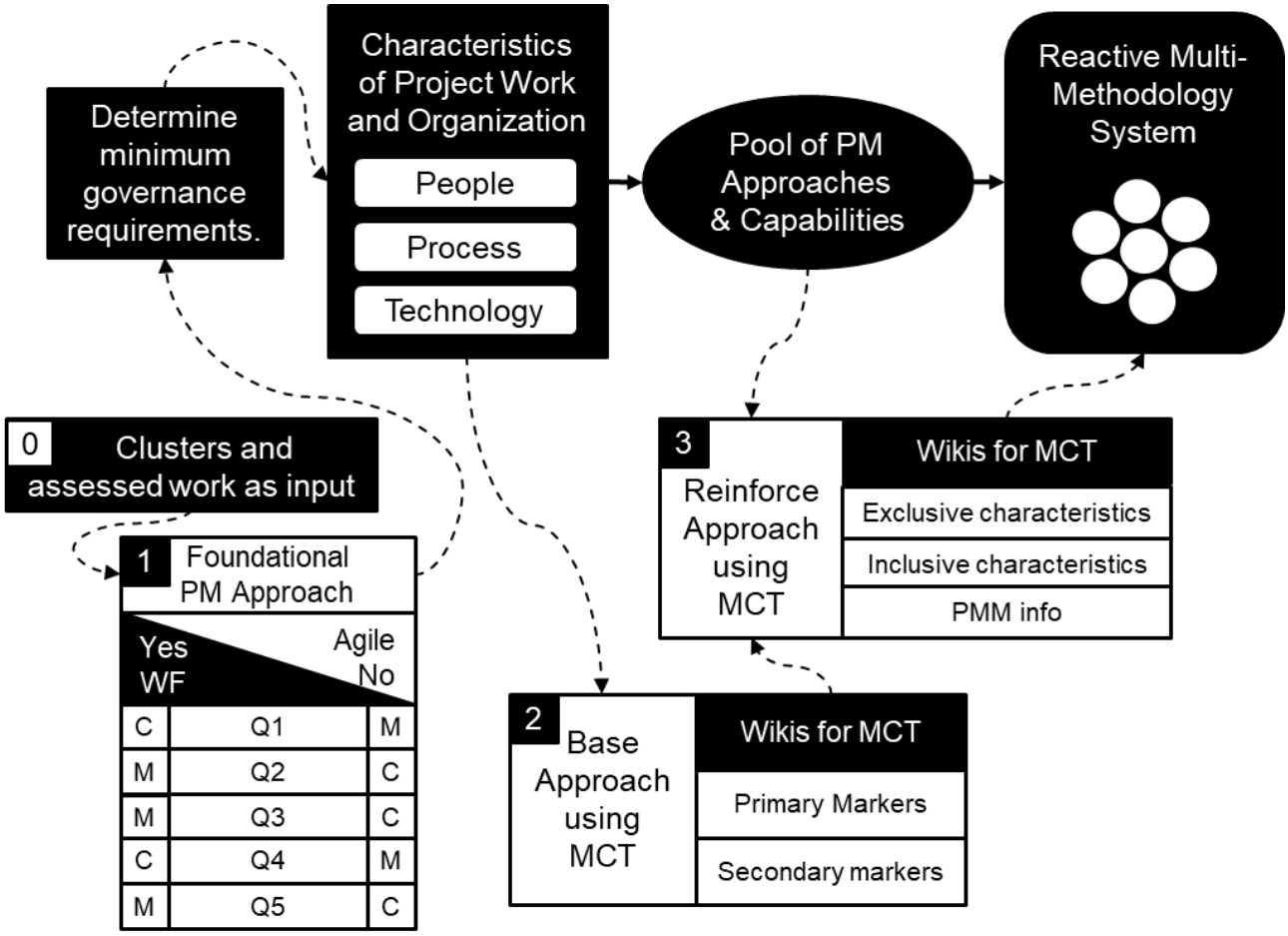


Figure 2.5.6-15: The Hybridisation Process Employing the MCT & Guide

Referring again to the differentiation of themes, principles, processes, and standards of project management (Figure 2.5.6-16), first occurring in section 2.5.3, and the differentiation hinges on ‘method specificity’.

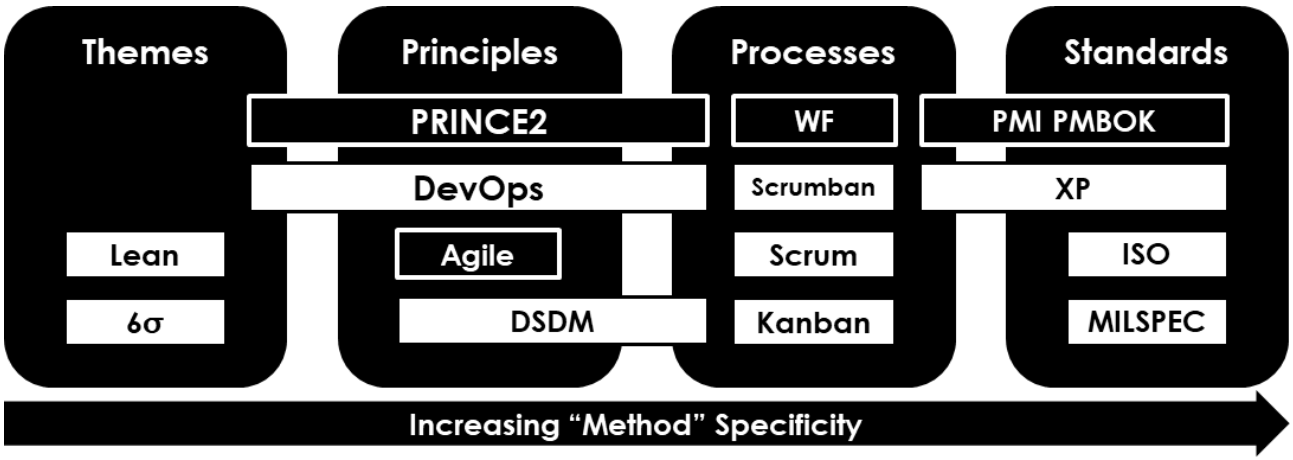


Figure 2.5.6-16: PM Themes, Principles, Processes & Standards, Adapted (Aston, 2021)

The fictional example that has been referred to in this section, and used for explanation, stated a case where requirements were not well understood at the time, and that a high risk of implication explosion was expected. The recommendation was that an agile initiative should first be completed with the specific goal of clarifying the requirements. Thereafter a decision could be made relating to the adequate approach for the greater delivery. At the low level of requirement certainty, an approach with high method specificity would be risky. Lower requirement certainty necessitates lower method specificity, and higher requirement certainty enables higher method specificity.

2.5.7 Verification

To enact a measure of assurance on the research process up to this point, a verification is described in this section. Whereas the design and development of the propositions look forward to the possible application selected principles in practice and the expected implications thereof, the verification looks backwards seeking to assess for quality and leanness.

The assessment for process quality asks:

- Were the observations responded to by the investigations that followed?
- Were the factors identified during the investigations translated into problem statements?
- Were the problem statements translated into research questions?
- Were research questions addressed by stating research objectives?
- Were the research objectives executed through the design and development of propositions?

This assessment produces traceability from the original observations through to the eventual propositions. It shows the items that were addressed, and how steps causally followed. Additionally, items that were not addressed are also identified through this assessment. These items are described in chapter 2.7 and are argued to have fallen outside of the feasible scope of this research project, with some of those items presenting opportunities for future research.

This assessment does neither speak to the quality of the execution of the process, nor can claims be made as to the appropriateness of the decisions that were made at the decision points during the execution of the process. As example, the decision was made to apply the VSM to the temporary organization as a response to some of the problem statements. The verification practiced in this section does not make a case for this being a good or bad choice, but does show the point after which this decision was made, and the actions following the decision.

The verification also enables an assessment for leanness. In a lean process each step is causally demanded and adds determinable value to the process. As such, each proposition needs to be traceable to a design requirement, each requirement to a problem statement that is being responded to, and the problem statements to factors identified during the investigations.

This assessment for leanness can illustrate the causal origins of steps in the process and outcomes. It can also identify ‘orphan’ process steps and propositions. But, it does not speak to the ultimate correctness of the process.

The items investigated for verification are listed in Table 2.5.7-1 and Table 2.5.7-2. Table 2.5.7-1 provides traceability from the initial observations through to the problem statements. Table 2.5.7-2 provides traceability from the problem statements through to the propositions.

Assessing for leanness, it can be observed from the tables that each proposition, design requirement, problem statement, and so forth, has at least one causal predecessor to which it is offered as a response. Whereas the value of any step or the adequacy of the preceding decision making may be investigated, it can be said that there causal orphans. Each proposition is traceable back through the process to the initial observations.

Assessing the process for quality, it can be observed from Table 2.5.7-1 that all observations are tested and investigated for. This lead to the identification of gaps in the literature, directives for future research, issues, and knowledge of the state of the field. Based on these factors problem statements were described. It can be noted that no identified matters were dropped during the course of these events.

When the problem statements were translated into the research questions that the study would attempt to address, and the research objectives that the study would seek to execute, choices were made regarding the problem statements that were assumed as feasibly addressable within the scope of this research study.

The excluded problem statements were:

- Explain: Agile factors not outperforming Traditional.
- Required research: Assess before & after project management approach change.
- Research & development required: Apply learnings from ITIL implementations to the implementation of changes to the IT project management approach.

These three problem statements are described in more detail in the seventh chapter (2.7). Although presenting opportunities for valuable research, it is estimated that dedicated research projects would be required to adequately address these problem statements.

Further to the verification in this section, Figure 2.5.5-1, Figure 2.5.5-2, Figure 2.5.5-3, Figure 2.5.5-4, Figure 2.5.5-5, and Figure 2.5.5-6 in section 2.5.5 further illustrates the traceability of propositions to design requirements and through to problem statements.

In conclusion for this section, there is traceability for all propositions back to the initial observations, and some problem statements were chosen to not be addressed during the execution of this research study (Table 2.5.7-1 and Table 2.5.7-2).

Table 2.5.7-1: Verification - Traceability from Observations to Problem Statements

Observation (2.1)	**Test**	**Implied Required Research**	**Implied Research**	**Gap/Issue/ Directive/State**	**Problem statements**
Changes to the organisational project management approach implemented frequently in SA banking. (2.1.1)	Indirect correspondence test: Practitioner input and publications by banks. Coherence test: Inferences drawn from published research. Outcome: implementations of project management approach changes are frequent, and are continuing; realized vs estimated benefits are debatable.	Is there a (near) ideal project management approach? Outcome: No-Silver-Bullet	State of project management approach theory.	A next step for the development of project management approach is the tailoring/hybridization of project-specific approaches.	Required research: Next step: project-specific PM approach.
			State of selection, tailoring and hybridization literature.	Research on the practical application is lacking, previous calls for research has not been adequately answered.	Research required: Practical aspects of tailoring & hybridization.
				Research revealed no adequate tool for the comparison of project management methodologies.	Research & development required: Aid for the comparison of project management approaches.
Lack of clarity regarding the benefits achieved versus the estimated benefits following the implementation of changes to the project management		Performance of traditional vs agile project management approaches. Outcome: Agile performs better overall, but not for all success factors.	Systems Thinking criticism of project management approach. Outcome: Predetermined project management approaches lack variety.	Success factors where Agile does not outperform Traditional.	Explain: Agile factors not outperforming Traditional.
				Project management approach success before and after change within firms.	Required research: Assess before & after PM approach change.
				Project management approach theory does not explain empirical findings.	Theory required: Empirical work demands theoretical work.

approach. (2.1.2)				The nuance of project management approaches is not sufficient for a highly complex context like IT project management in SA banking.	Research & Development required: Nuanced PM approach for highly complex SA banking IT.
				Project management approaches do not adhere to Systems Thinking Principles relating to variety, adaptability, local management.	Research & development required: Apply Systems Thinking principles to IT project management approaches.
		Cases of successful implementations of approach changes in IT. Outcome: ITIL implementations are well described in literature.		Learnings from ITIL implementations can be applied to the implementation of changes to the IT project management approach.	Research & development required: Apply learnings from ITIL implementations to the implementation of changes to the IT project management approach.
Strong and widespread project management approach dogmatism among practitioners. (2.1.3)	Coherence test: Inferences drawn from published research, blogged content and interactions with practitioners. Outcome: project management approach dogmatism is common among practitioners.	Outcome relating to dogmatism: the evidence does not justify dogmatic preference of any one project management approach.	Outcome relating to dogmatism: variety is required instead of dogmatism.	Antidote to project management approach dogmatism.	Required: PM approach dogmatism antidote.
Observation (2.1)	**Test**	**Implied Required Research**	**Implied Research**	**Gap/Issue/ Directive/State**	**Problem statements**

Table 2.5.7-2: Verification - Problem Statements to Propositions

Problem Statements	**Research Questions**	**Research Objectives**	**Hypotheses**	**Design Requirements**	**Propositions**
Required research: Next step: project-specific PM approach.	What could the characteristics for an improved model of the large, complex IT project in SA banking be?	Design & validate: an improved model of the large, complex IT project in SA banking.	H1: There is value to the theory and practice of project management in executing the research objectives. H2: The development of the propositions of the study is valuable to the theory and practice of project management.	An improved approach to IT project management in SA banking, enabling adherence to Systems Thinking Principles relating to variety, adaptability, localized management, and control.	MMS for IT project management in SA banking.
Research required: Practical aspects of tailoring & hybridization.	What could the characteristics for selection, tailoring and hybridization of project management approaches.	Design & validate: Guide for selection, tailoring and hybridization of project management approaches.		Enable a sophisticated understanding of project work and guide the assessment of project work. Guidance on the grouping of assessed work. Explain which elements can be monitored, coordinated, or controlled.	Clustering of Project Work
Research & development required: Aid for the comparison of project management approaches.	What could the characteristics for a project management approach comparison and hybridization aid be?	Design & validate: Project management approach hybridization and comparison aid.		Provide recommendation and information to support the hybridization of the approaches for the clusters. Process: Provide recommendation, guidance and information to support the hybridization of the approaches. Identify minimum governance requirements and build into hybridized PM approach.	Methodology Comparison Tool & Hybridization Guide
Explain: Agile not outperforming Traditional.	Can an improved theoretical model explain empirical findings?	Improve model should include: Include: Explanation of empirical findings.		Apply the VSM to project management.	VTSM of large, complex IT project in SA banking.

Problem Statements	Research Questions	Research Objectives	Hypotheses (Cont.)	Design Requirements	Propositions
Required research: Assess before & after PM approach change.	Not addressed.	Not addressed.		Not addressed.	Not addressed.
Theory required: Empirical work demands theoretical work.	Can an improved theoretical model explain empirical findings?	Improve model should include: Explanation of empirical findings.		Apply the VSM to project management.	VTSM of large, complex IT project in SA banking.
Research & Development required: Nuanced PM approach for highly complex SA banking IT.	What could the characteristics for an improved model of the large, complex IT project in SA banking be?	Improve model should include: Enable the adherence to Systems Thinking Principles.		Requirements not listed above: A model of the large complex project that lays the foundation for unique project management approach and methodology hybridization for the individual project. (VTSM) Applicability to large, complex projects in SA banking IT. (VTSM) A means of executing integrated delivery across locally managed deliverables. (Network Arrangement)	All aspects of the MMS for IT project management in SA banking: VTSM; Clustering; Methodology Comparison Tool & Guide; Network Arrangement.
Research & development required: Apply Systems Thinking principles to IT project management approaches.					
Research & development required: Apply learnings from ITIL implementations to the implementation of changes to the IT project management approach.	Not addressed.	Not addressed.		Not addressed.	Not addressed.

Problem Statement	**Research Questions**	**Research Objectives**	**Hypotheses (Cont.)**	**Design Requirements**	**Propositions**
Required: PM approach dogmatism antidote.	*Indirectly addressed by improved model for IT project management in SA banking and project management approach comparison aid.*	*Indirectly addressed: Project management approach hybridization and comparison aid.*		*The requirements listed above require for a proposition not advocating for either/or choices between project management methodologies, but rather enabling hybridization. Pluralism is therefore advocated over dogmatism.*	*Indirectly addressed by VTSM of large, complex IT project in SA banking, and MCT & Guide*

2.5.8 Conclusion

This chapter (2.5) detailed one part of the execution of the research objective: to address the research questions by designing and developing propositions which respond to selected problem statements.

Following the Systems Thinking criticisms of project management approaches (described in section 2.3.5 of chapter 2.3), it was decided to apply Systems Thinking principles to project management approach in response. The VSM was applied to the temporary organization (the project) with the aim of increasing the variety of management responses that can be enabled by a project management approach.

The application of the VSM to the temporary organization yielded the Viable Temporary System Model, which provided a theoretical foundation for the allowance of local management of the components of a project. The local management of the components of the project provides the foundation for the utilization of multiple project management methodologies in the execution of a project.

The other propositions can each be traced back to a problem statement, and are also the practical enablers of the Viable Temporary System Model:

- The Clustering of Project Work guides the assessment of project components' work so that the necessary information can be provided for hybridization.
- The Methodology Comparison Tool & Guide provides information on the attributes of different project management methodologies and a guide to applying information from the Tool and Clustering assessment during hybridization.
- The Network Arrangement of Project Work provides an approach to integrating the delivery of the uniquely and locally managed components of the project.

In terms of the Hegel Circle, the design and development of the propositions are a synthesis between the abstract ideal and the reality of practice. 'Local management' and 'adaptability' may be rationally acceptable as ideals, but a synthesis is required to propose the possible application in practice. As such, the proposition cannot be wholly foreign, but must resemble reality so as to be interpretable in practice. It is argued that the Multi-Methodology System is not new, but rather a formalization of what already occurs in practice. As examples of this (described in chapters 2.2 and 2.3): hybrid approaches are growing in popularity, practitioners already employ multiple methodologies on projects, and predetermined approaches cannot offer the requisite variety of responses to project needs.

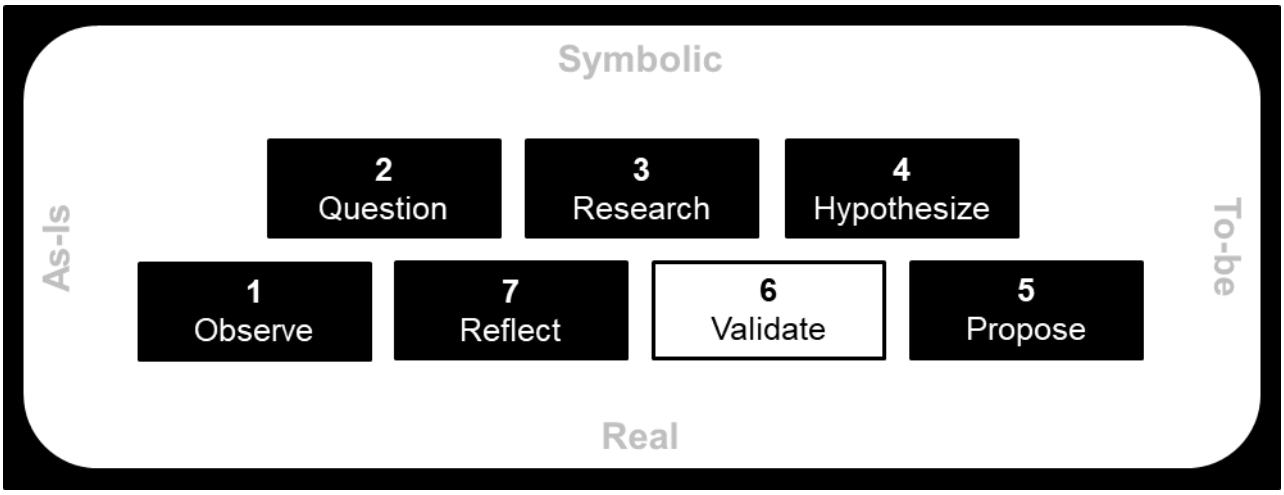
The problem statements were conclusions drawn after conducting background research. The conclusions (problem statements) are reasoned, but may be mistaken. The design requirements for the Multi-Methodology System were responses to the problem statements. The responses (the design requirements) were explained, but may be misguided. The propositions were developed from the requirements, but the development may be inadequate.

In the causal chain of the research process some responses are directly implied and demanded by uncovered facts. Other responses are indirect, results from inferences, and are chosen among options. One of the ways in which to judge the adequacy of the process, and the value of the study, is to take the research process closer to the reality of practice. This is described in chapter 2.6 – the validation of the propositions.

2.6 Validate – The Test of the Propositions

"There is nothing more frightful than ignorance in action."

Johann Wolfgang von Goethe



Project management is, first and foremost, a practiced craft. Whereas any proposition may be justifiable as theoretically valuable, not all propositions are useful. In chapter 2.5 the design of the Multi-Methodology System to address Systems Thinking concerns and other problem statements were explained, and traceability from the problem statements through every step up to the presentation of the propositions was verified. However, the propositions can only be argued to be of value if project management practitioners adjudge the propositions as having the potential to be of practical use.

The propositions were therefore presented to IT project management practitioners in SA banking. After the presentation, practitioners were asked if the Multi-Methodology System made sense, if they deemed it implementable, and if they thought that it was a feasible utility for the hybridization of unique project management approaches.

In terms of the Hegel Circle, the synthesis of the ideals and the reality of practice in the design of the propositions (2.5), brought the abstract principles closer to the real world. The validation takes it one step closer to reality, by showing the propositions to practitioners and requesting their feedback. It is a coherence test of truth – the test is for a general agreement in accepting or rejecting the propositions.

The Hegel Circle prompts the stating of hypotheses. The hypotheses seek a response as to the value of the study. The validation of the propositions is an attempt at producing a response regarding the hypothesis that the propositions of the study are valuable to the theory of project management and the practice of IT project management in SA banking.

The propositions were presented to practitioners by explaining how it would be applied to a banking IT project. The next section (2.6.1) offers a similar description of the application of the Multi-Methodology System to a fictional, though realistic, banking IT project. The

validation design (2.6.2), validation execution (2.6), and the validation results and discussion thereof (2.6.4) follows thereafter.

As also explained in section 0, the validation practiced during the execution of this study can best be termed a Fuzzy Delphalsification. There are Delphi aspects to the validation by virtue of iterative engagement with expert practitioners and peers. The continuous scrutiny of observations, conclusions, and propositions seek to add falsification to the validation process. The application of the Delphi aspects was fuzzy since the Delphi technique was not applied in a fully-fledged, formalised fashion throughout the execution of the research study. The application of falsification was fuzzy, or rather, not ultimately successful, because the observations, conclusions, and propositions were defended with a natural bias by the presenter during presentations. The questionnaires used during the validation also prompted affirmative responses when, for the purpose of falsification, encouragement of dissent would have been better.

That having been said, expert practitioner and peer feedback was utilised and regular interval during the development of the design requirements for the propositions, and the envisioned Multi-Methodology System was presented to an adequate sample of expert practitioners for validation.

2.6.1 The Application of the Multi-Methodology System to a Fictional Project

The validation of the Multi-Methodology System required the assembly of the constituent components into a prototype. The prototype enabled the verification of delivering on the design requirements (described in 2.5, 2.5.2, 2.5.3, and 2.5.3). Furthermore, the prototype was a communicable version of the proposition that was presented to IT project management practitioners in SA banking for validation.

The Multi-Methodology System is illustrated at a high level in Figure 2.6.1-1. A description as presented to the practitioners during the validation and the verification of the design requirements, at this level, will follow. Thereafter the same is done for the elaborated components of the Multi-Methodology System which are illustrated in Figure 2.6.1-2, Figure 2.6.1-3, Figure 2.6.1-4, Figure 2.6.1-6, and Figure 2.6.1-7.

The Multi-Methodology System is divided into five parts wherein five distinct processes are executed:

- First, the project work is assessed in order to understand the nature of the work to be completed, and to be able to estimate the project management approaches that would be appropriately enable the delivery of the work.
- Second, the portions of work requiring similar project management approaches are clustered together.
- Third, the Viable Temporary System Model for the project is created, indicating the clusters that will be ‘locally managed’ and the set-up and requirements of the project’s integration and control functions.

- Fourth the project management approach for the project overall, and the methodological approach to the management of the clusters are hybridized.
- Fifth, the clusters and delivery units of the project are Network-Arranged.

The application of the Multi-Methodology System is described by describing how it would be utilized for a fictional, though realistic, IT project in SA banking. The fictional project, called *Stork-Swallow*, responds to the following business need:

A transactional banking project enabling an account holder to use the mobile banking application to transfer funds cross-border to a pre-verified personal bank account.

A specific example of the use of this product would be of a parent transferring funds to a child who is studying overseas.

Refer to Figure 2.6.1-2 for this description of the assessment of project work in service of the clustering of project work.

A temporary organization, the project *Stork-Swallow*, is created to address the business need. The appointed project manager calls representatives from the *Project Office*, *Systems Development*, *IT Infrastructure*, *Compliance*, *Channel*, *Marketing*, *Client Contact Centre*, the main client of the project, and the new product's eventual operational manager together for a meeting to determine the high-level deliverables of the project.

The high-level project deliverables (refer to the box marked '1' in Figure 2.6.1-2) that can be derived from the implications of solving the stated business need are defined at an early stage as:

- Functions directly addressing the business need:
  - The transactional functionality relating to core banking systems.
  - The transactional functionality relating to the mobile banking application.
  - The client facing interface on the mobile banking application.
- Components required or implied by the direct functions
  - The regulatory requirements relevant to the planned transactional functionality.
  - Internal compliance requirements.
  - Expanding the existing IT infrastructure to accommodate the resultant data processing requirements.
  - Marketing.
- Preparations for the operational management of the new product:
  - Training of client-facing sales and support staff.
  - Training of back-office staff.

The product owner for *Transactional Banking Products* is the sponsor and main client of the project. The functions directly addressing the business are likely to benefit most from the main client's direct involvement in an agile set-up. Among the implied components, Marketing is identified as likely to benefit significantly from direct client involvement. Regulatory requirements and internal compliance requirements are identified as components for which minimum requirements should be produced, all of which need to be delivered on. The project manager is identified as adequate for the client role for these deliverables, given past experience with compliance and regulatory projects.

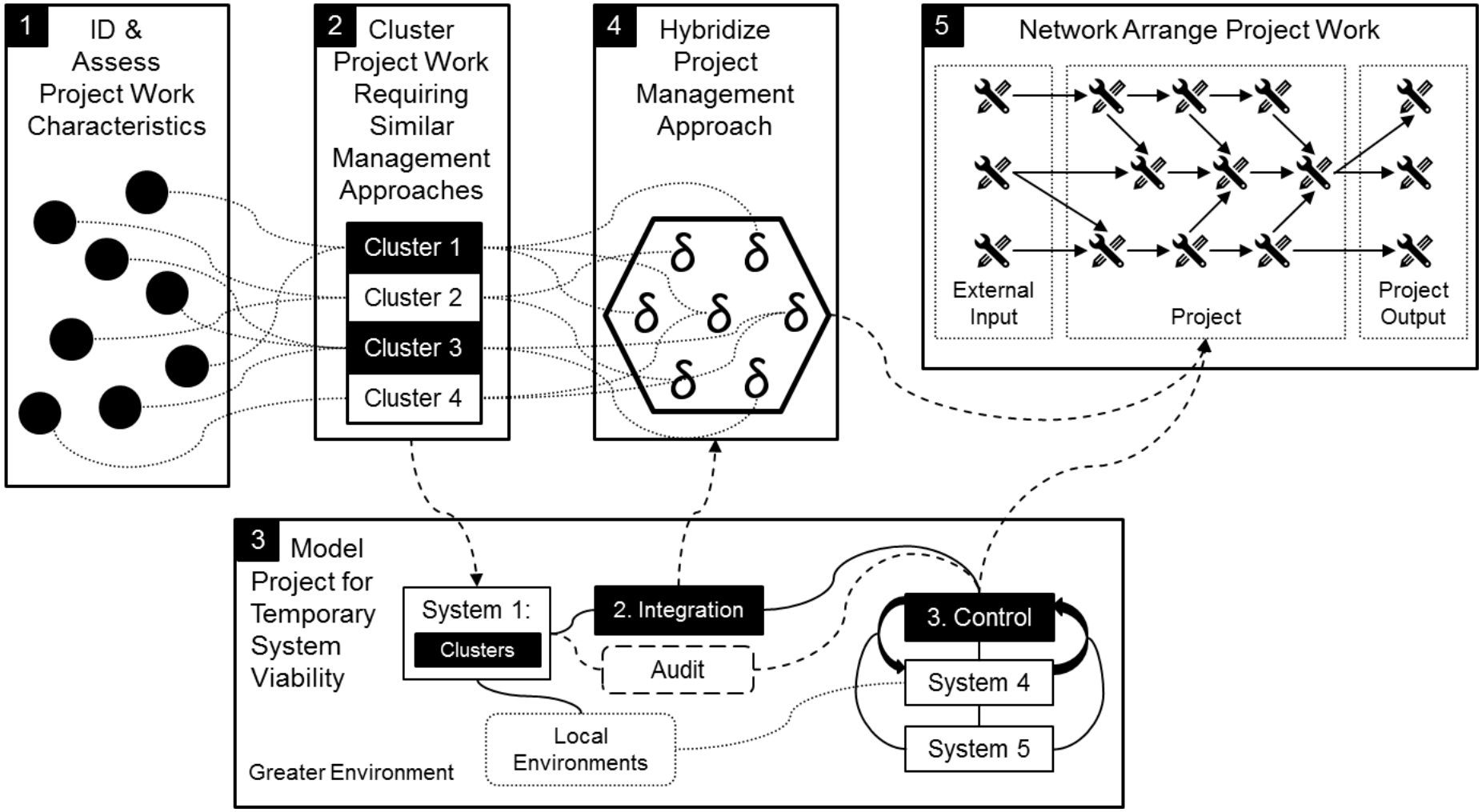


Figure 2.6.1-1: The Multi-Methodology System for Large Complex Projects in SA Banking

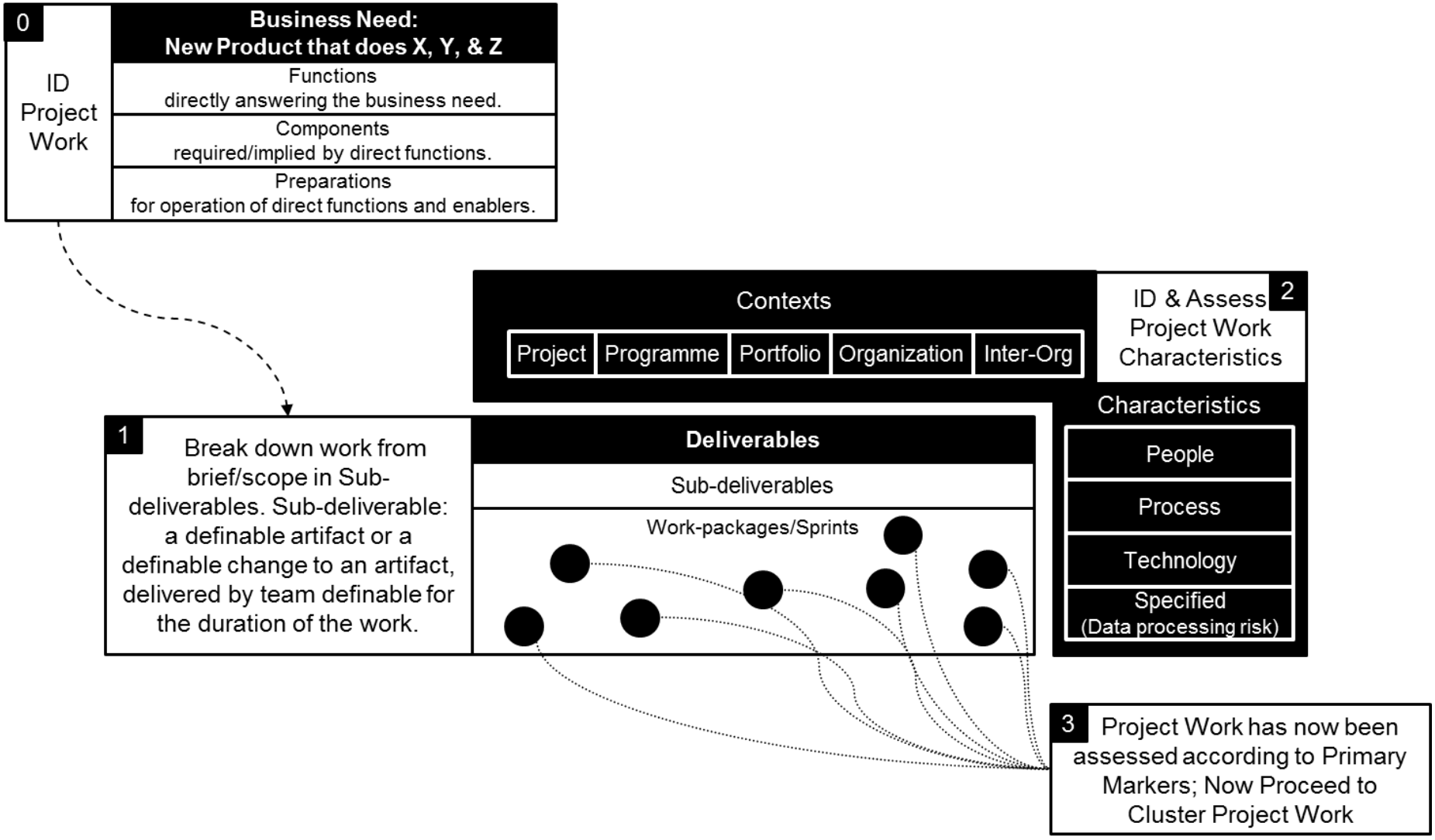


Figure 2.6.1-2: Assessment of Project Work in Service of Clustering

IT infrastructure will derive their requirements from the functions directly addressing the business need and may present scenarios with different costs and timelines depending on the processing speed required and the surplus capacities among the capacities already allocated to the *Transactional Banking Products* product line. The operational manager for *Transactional Banking Products* is identified as the adequate for the role of client for the role of client.

A representative from the *Client Contact Centre* and *Channel* will act as clients for the training of client-facing and support staff.

The operational manager for *Transactional Banking Products* is identified as the adequate for the role of client for the role of client with regards to the training of back-office staff.

The next elaboration (refer to the box marked ‘2’ in Figure 2.6.1-2) involves identifying the sub-deliverables that make up the main deliverables of the project.

For the deliverable concerning the transactional functionality relating to core banking systems, the following sub-deliverables could be identified:

- Creating the product on the core banking system.
- Determining and coding the business rules for the product into the instance of the product on the core banking system.
- Determining and coding the interface to the mobile banking application in the core banking system.
- Determining and coding the interface to the regulatory interface in the core banking system.

The sub-deliverables are further elaborated by describing the delivery units by which the sub-deliverable will be delivered.

The delivery unit is assessed according to the contextual dependencies (referring to the box marked ‘3’ in Figure 2.6.1-2) wherein it is delivered. For example, consider the dependencies relating to the coding of product’s business rules:

- Within the sub-deliverable:
  - The coding of the business rules is dependent on receiving the business rules to be coded for.
- Between sub-deliverables:
  - The coding of the business rules is dependent on the completion of the creation of the product on the core banking system.
  - The coding of the interfaces is dependent on the completion of the coding of the business rules.
- Between high-level deliverables:
  - Marketing is dependent on the completion of the coding of the business rules to be sure of the product functions that can be marketed for.
  - Training is dependent on the completion of the coding of the business rules to be sure of the functions that should be trained for operations.
- Between projects:
  - Resources need to be released from previous assignment to code on this project.

    - Resources coding on this project need to be released for another project.
- Between organizations:
    - The business rules for this project are dependent on the transactions allowed by current regulation.

The delivery unit are further assessed (still referring to the box marked ‘3’ in Figure 2.6.1-2) by analysing people, process, and technology characteristics.

With regards to the characteristics of the core banking coding the following is determined:

- The software development team is well managed and very familiar with the task at hand.
- The team has limited capacity, since it has been hard to replace retiring software developers (The Hogan core banking system runs on an IBM mainframe, and the coding language is COBOL).

With regards to the mobile banking application development, the following is determined:

- The internal mobile development team is relatively inexperienced, and the technology is relatively new to the bank.
- The team is under-resourced since a national shortage exists for software developers who can both code for traditional mobile operating systems (using Objective C or the like) and for the more modern (using Swift and the like). Therefore, either a lead-time is incurred or a third-party vendor will be required.

The implications of the characteristics of these two teams are that the core banking coders could be provided the maximum freedom, while greater management intervention would be applied to the internal team responsible for the mobile banking development.

The next step in the processing of project work, referring now to box ‘1’ in Figure 2.6.1-3, concerns the teams responsible for the deliverables:

- The project management work.
- Work delivered by resources directly reporting to the project manager for the duration of their delivery.
    - Business analysis.
    - Compliance.
- Work delivered by teams reporting into Team Leads:
    - Core banking system coding.
    - Mobile application development.
    - IT Infrastructure.
    - Marketing.
    - Training.

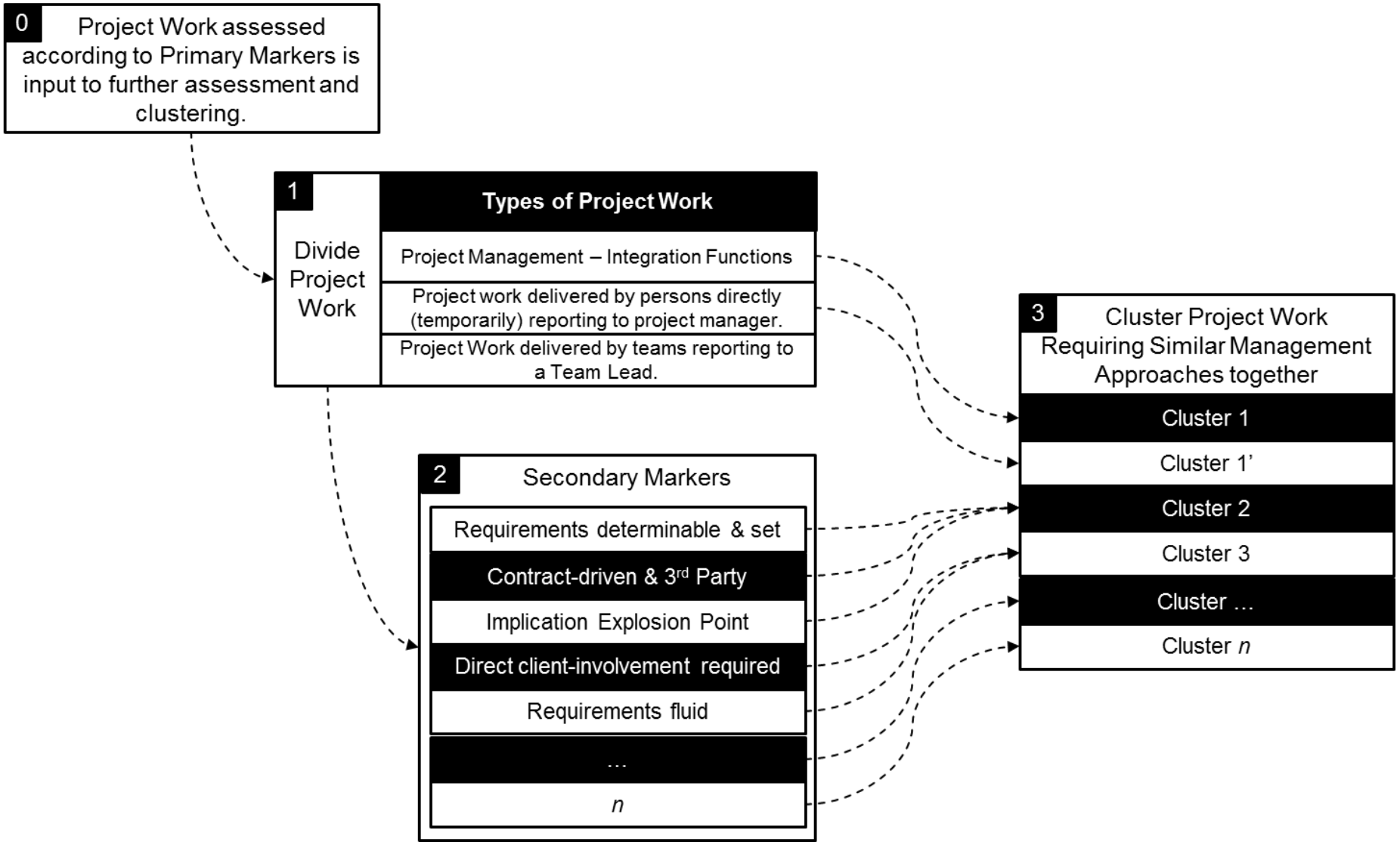


Figure 2.6.1-3: The Clustering of Project Work

The last analysis of the project work, referring now to box '2' in Figure 2.6.1-3, concern the nature of requirements identification and service level agreements or contracts with 3rd party suppliers, since these aspects will have an impact on the methodological choices that are applicable during the hybridization of the project management approach. A couple of characteristic-questions include:

- Can the requirements be determined and set in stone before execution commences?
  - 'No' for core banking system, mobile development, and marketing.
  - 'Yes' for compliance (dependent on business rules), IT infrastructure (dependent on core banking system and mobile development), and training (dependent on core banking system and mobile development, and marketing).
- It is not expected that the resource requirements or costs will start to exponentially increase at some point?
- Direct client involvement is required for the mobile development and marketing components of the project.

With the benefit of the information gathered concerning the project, the deliverables, and the work necessitated to execute the project, the project work is now grouped into clusters of work requiring similar methodological management approaches:

- Cluster 1: Compliance & Business Analysis.
- Cluster 2: Core banking systems development.
- Cluster 3: Mobile banking development.
- Cluster 4: Marketing & Training.

The Viable Temporary System Model set-up of the project, referring to Figure 2.6.1-4 follows the clustering of project work had concluded. The clusters form the System 1 components – the delivery and implementation of changes brought about by the project. These clusters that become System 1 components consist of:

- The delivery orientated work executed by resources directly reporting to the project manager for the duration of the execution of their project work.
- Clusters of work delivered by teams reporting to internal Team Leads.
- Clusters of work delivered by teams reporting into external Team Leads.

The project management function, as it pertains to the coordination and integration of project delivery, constitutes System 2 of the Viable Temporary System Model.

The Project Office and Governance functions are contained in System 3 and System 3'.

For a 'normal' large, complex project System 3', System 3 and System 4 would represent a shared service, like a Project Office (System 3) and the Portfolio Management capability (System 4) of the bank. The scope of project Stork-Swallow does not necessitate the formation of a dedicated project office.

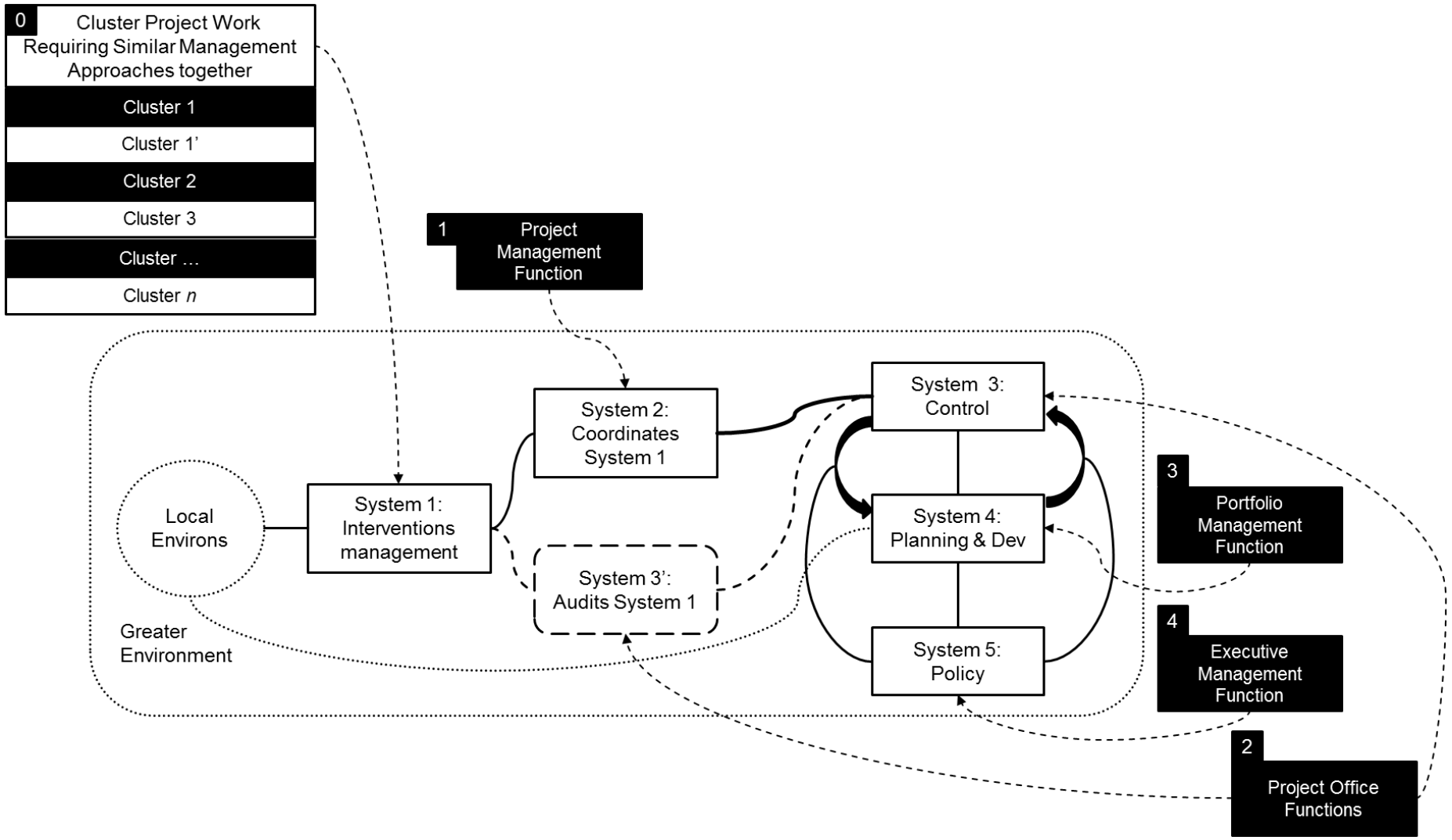


Figure 2.6.1-4: The Viable Temporary System Model Set-up of the Project

In cases of very large, high-risk projects and programmes, dedicated Project Offices Portfolios may be created. Examples of this in SA banking include Standard Bank's SAP[62] Core Banking Replacement programme and Absa's post-Barclay's migration programme. The System 5 component will always remain at the very highest, executive management level of the organization, and there remain outside of the ambit of the project delivery function. In the case of very high priority projects, representatives from System 5 may be directly involved with a project in the role of a client or sponsor.

With the assessment of the project deliverables, the characteristics of the implied work, and the contexts wherein delivery occurs, the reactive hybridization (Figure 2.6.1-6) of the Multi-Methodology System can ensue.

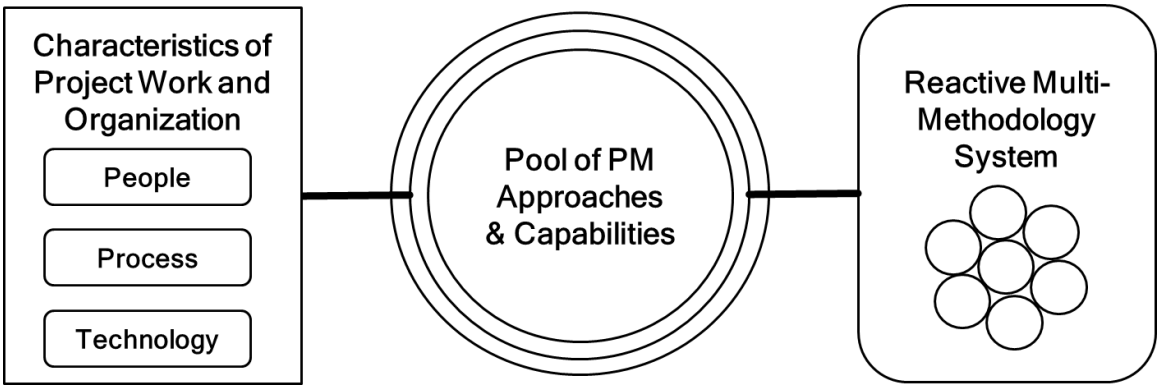


Figure 2.6.1-5: The Reactive Multi-Methodology System

The hybridization of the Multi-Methodology System is a response to the characteristics and contexts of the project rather than a predetermined approach and methodology, as illustrated in Figure 2.6.1-5. Minimum governance requirements have been communicated to the project manager.

It can therefore be stated that whereas the governance requirements communicated to the project had been pre-set, and the characteristics and contexts of the project are what they are, it is the project management approach that is adaptable, and that should be adapted in order to optimize project delivery.

The hybridization for System 2, the coordination and integration function – project management work – is completed first. The first step is illustrated by box '1' in Figure 2.6.1-6. There are aspects of the project that determine whether agile or waterfall can feasibly be adopted as the foundational project management approach, and there are aspects that should strongly dissuade the practitioner from selecting either agile or waterfall as a foundational approach.

[62] Systeme, Anwendungen und Produkte in der Datenverarbeitung (Satan's Accounting Package for Demonic Work).

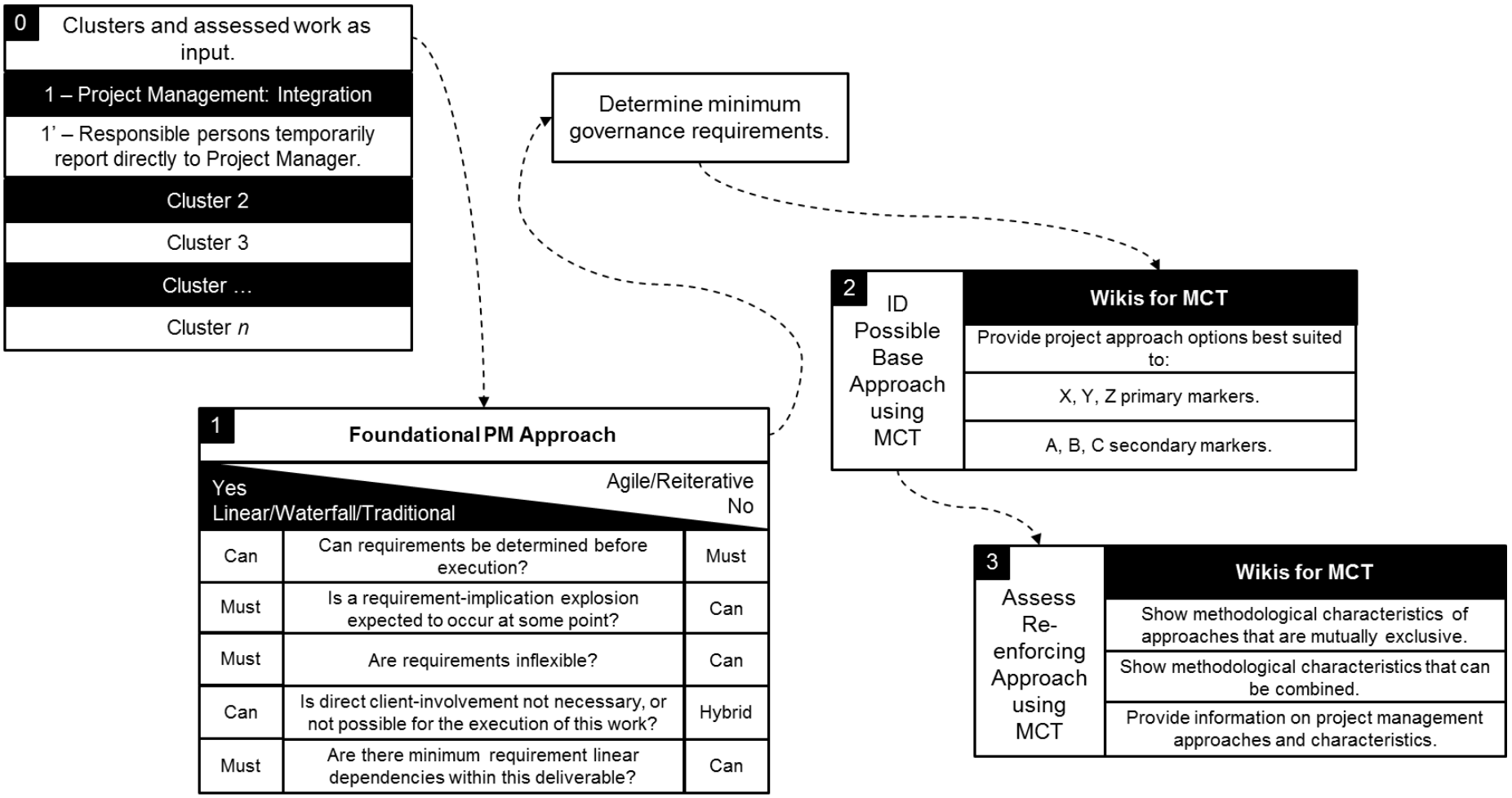


Figure 2.6.1-6: Hybridization Using the Methodology Comparison Tool

There are situations wherein a waterfall approach must be strongly considered as the foundational approach. This is when all documented requirements must be delivered on – when there is no division between must-do, should-do, or would-do requirements. One of the key features of agile is that the requirements are flexible, while timelines and resources are not. Furthermore, waterfall is an appropriate choice as a foundational approach when requirements can be known beforehand, and are fixed and inflexible.

Another factor that would strongly count in favour of a traditional approach, is when the project is expected to reach a point referred to as an implication explosion. An example is a project where an extensive analysis and design phase is required to identify the requirements. The design phase may have a relatively small resource impact, whereas the execution (or build) stage may see exponential growth in resource and budgetary requirements. In this case linear progress, finalized specifications, and stage gated approvals before venturing into execution would be an important risk mitigation.

Similarly, still referring to box ‘1’ in Figure 2.6.1-6, there are characteristics that would strongly favour the adoption of agile as the foundational project management approach. In many cases these speak to the opposites of the characteristics counting in favour of traditional approaches. If requirements cannot be determined before an execution phase, if requirement changes are not expected to have a great impact on budgets or the like, and if there is a healthy mix of must-do, should-do, and would-do requirements, agile would present the better choice for a foundational approach.

It follows that there can be a case where there is little clarity regarding the final requirements, which counts out traditional approaches, but also the expectation that implication explosion may occur in the execution (or build) stage of the project. In this case it would be proposed that an agile project undertaken with the goal of delivering the requirements design. The agile approach may be combined with rapid prototyping to further enhance the requirements and design finalization. The build (or execution) for the production version of the deliverables can be approached as new project for which design and requirements had been delivered at a high level of confidence.

The Methodology Comparison Tool supports the selection of the foundational project management approach. The factors indicated in box ‘1’ in Figure 2.6.1-6 are presented as questions requesting multiple-choice responses. The tool produces a recommendation with explanation following the input.

The next step in the hybridization is to reinforce the chosen foundational project management approach with characteristics of other project management methodologies box. The Methodology Comparison Tool provides feedback regarding the characteristics of, say, DSDM Agile that can be combined with a foundational Waterfall approach based on Prince2 (‘2’ in Figure 2.6.1-6). The Methodology Comparison Tool also provides feedback on the characteristics which are mutually exclusive between different project management approaches box ‘3’ in Figure 2.6.1-6. The questions posed by the Methodology Comparison Tool, according to which recommendations are produced, relate to the information produced during the assessment of project work as illustrated in Figure 2.6.1-2 and Figure 2.6.1-3.

The process of hybridization can then be repeated for the clusters with the Methodology Comparison Tool supporting the selection of a foundational methodology and enabling the

reinforcement of the foundational methodology with complimentary characteristics presented in other methodologies.

The process as illustrated in the diagrams in this section, and as described in the text in this section, may seem complicated. It is argued though that the hybridization of the Multi-Methodology System is intuitive in practice, and can be summarized by the following points:

- First, the characteristics of the project, the constituent work, and the extra-project environment must be assessed and understood.
- Second, the constituent work is organized into clusters.
- Third, the temporary organization – the project – is constructed to suit the demands of the work to be completed and the characteristics of the greater organization.
- Fourth, an adequate foundational project management approach is chosen for the overall project and reinforced with value-adding characteristics of other project management methodologies. This process is repeated for the clusters.

There are a couple of things to note. First, this is the process that already plays out in practice, the Multi-Methodology System is not a novel approach to project management, but rather presents a novel attempt to formalize and support this process. Secondly, whether an organization claims to run fully Agile or steadfastly Waterfall, the fact is that it is nearly impossible for either to be the case, and the reality is that a project progresses linearly at the highest level, reiteratively at the middle levels, and linearly again at the lowest levels where actual work, like programming, is done.

The Network-Arrangement of project work, illustrated in Figure 2.6.1-7, is utilized to tie the Multi-Methodology System together.

The project is expected to report periodically to the project office, or whichever entity owns the organization’s project governance. Some projects may similarly be required to report periodically to internal compliance or external regulators.

The argument in favour of a reactive Multi-Methodology System instead of a predetermined project management approach is that the project is mainly required to deliver information to project governance, compliance, and the regulators. If the temporary organization can commit to delivering, and actually deliver, the agreed information as and when stipulated, the internal management of the project should not be of concern to project governance or compliance.

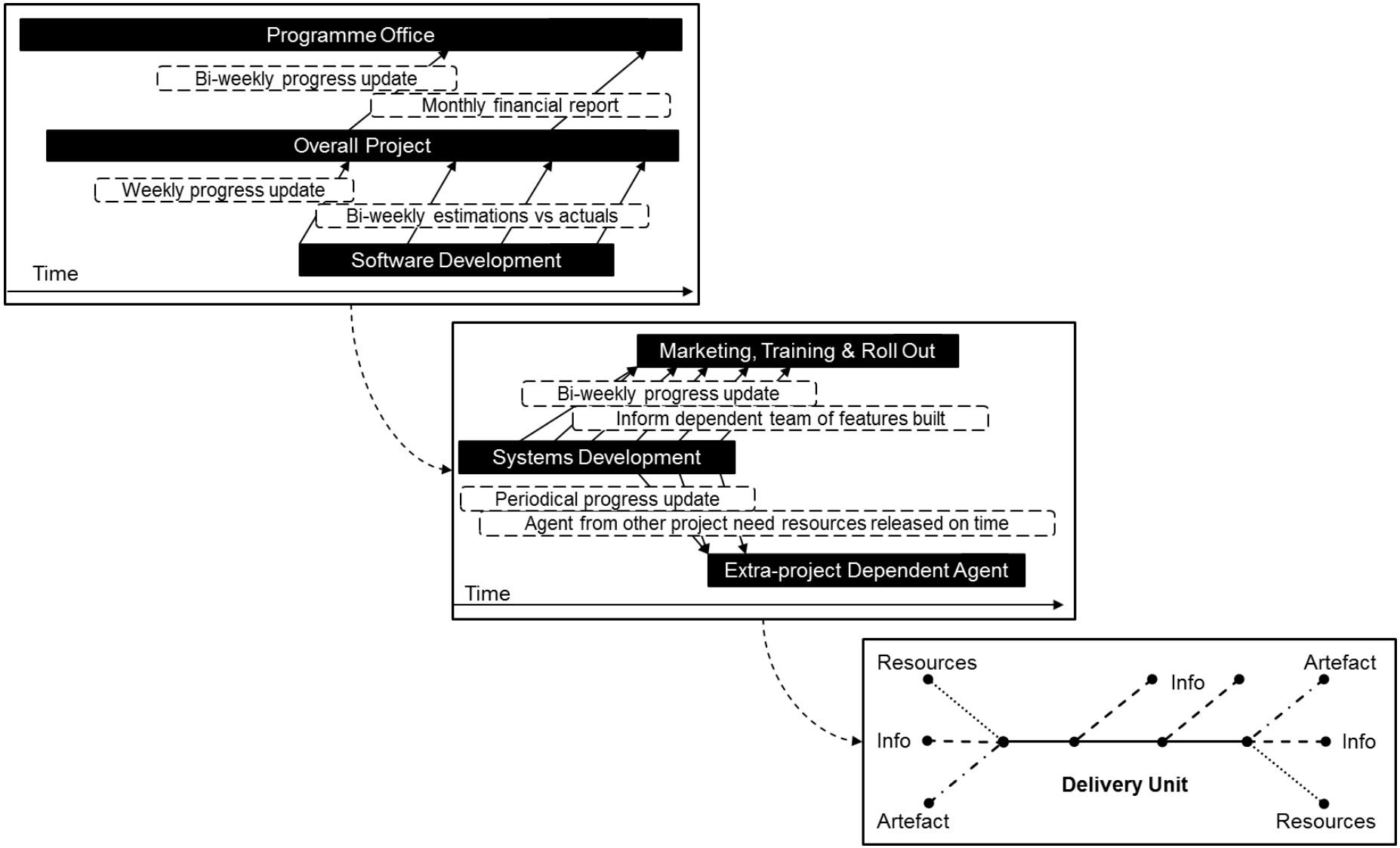


Figure 2.6.1-7: The Network-Arrangement of Project Work

Furthermore, the project needs to accept allocated resources at an agreed point in time, utilize these resources, and release the resources at an agreed time. The project will also take certain artefacts at a certain point, and is expected release changed or new artefacts at future agreed upon point in time. Again, the internal management of the project is not of importance extra-project actors, all that is important is that the flow is adequate and that the quality of the artefacts delivered by the project is satisfactory. It happens too often that quality assurance focusses on monitoring a process, when those who practice quality assurance has little to no knowledge of that which constitutes adequate quality as it pertains to the artefact.

Similarly, the constituent clusters of the project are required to deliver information to the project management function, but as long as the clusters deliver according to plan, the project management function does not need to interfere with the management as practiced by the team lead.

Eventually, at the Delivery Unit level, the Delivery Units are connected in a network stipulating the flow of resources, information and artefacts. The Network-Arrangement of projects down to the level of the Delivery Units can provide a real-time view on project, and portfolio-wide, progress and dependency risks.

Again, this is not a novel description of project delivery as much as it simply seeks to formalize the natural form that project delivery takes.

2.6.2 Formal Practitioner Validation Design

The Multi-Methodology System was validated during one-on-one and small group sessions with IT project management practitioners in SA banking. The propositions were presented by explaining the application of the Multi-Methodology System to a project. After the presentation respondents were requested to provide structured and unstructured feedback.

2.6.2.1 Sample Selection

The complexity of the propositions was estimated to require one-on-one sessions when an hour or less was available for a validation session. Two participants per session were assumed as the upper limit for a useful session that had no hard time limit. The challenge of scheduling professionals for one-hour slots, with in a single afforded week, with locations for the sessions spread across the Johannesburg metropolitan area, demanded that the sample had to be of high quality, since quantity was constrained.

The quality criteria for the sample came down to ensuring good coverage of the major SA banks; an adequate range of key project stakeholders, with regards to role at the time of participating, IT project management experience, relevant education and qualifications; and an adequate variation between participants who have been employed at various banks and others whom have spent the majority of their careers at a single institution.

A sample of 21 professionals participated in the validations. Thirteen participants had been employed at only one bank. Each one of the Big Five banks are represented[63] by these thirteen persons, and at least one person had been a long-term employee in IT project management in each of the Big Five. Of these thirteen persons, six worked for third-party service providers to the banking industry, before becoming employees of the banks. One of the thirteen had a successful career in one of the Big Five, before moving to one of the significant third-party service providers to the banking industry.

Eight participants had worked at multiple banks and account for 23 positions filled. It is common for contracting IT project managers to be employed at multiple institutions throughout their careers (Potgieter and Snyman, 2018). Altogether, 36 positions were held in banks by the participants, all related to IT project management in banking. The Big Five are well represented, as is a brand-new entrant to the industry, TymeBank, as is an African bank that operates outside of SA's borders in Southern Africa. The SA Reserve Bank is poorly represented in the sample; a notable though smaller (than the Big Five) bank, Investec, is not represented in the sample[64]. Other newer and smaller banks are not represented in the sample.

Of the 21 participants, thirteen had held positions in third party service providers to the banking industry, for a total of 49 positions held at different banks and third-party service providers. Lastly, ten positions in non-related businesses were held by the 21 participants.

The participants, at the time of the validation, characterized their seniority as follows: one analyst-level professional, three middle managers, eleven senior managers and six executive managers. Three of the senior managers listed that they had previously held executive positions at third party suppliers before moving or returning to a senior management position in a bank. All banks, as defined above as 'represented', are well represented by experienced and well-regarded personnel[65]. It is arguably of more importance that business analyst, project manager, program manager, portfolio manager, systems developer, project finance executive, project management trainer and lecturer, change manager, business process engineer, head of department, chief information officer, chief technology officer, amongst others, were listed by participants as past or present roles. Furthermore, a healthy range of components[66] of the large, complex IT project in banking was represented by the participants.

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[63] Representation from a range of banks was sought so that the range of ideas that are prevalent in the different banks would be represented in the validation. Participants were expressly requested to act on their own behalf, in their personal capacity, and encouraged to draw on all experience, while accepting that the latest environment would have the most significant impact on their project management-related *Weltanschauung*.

[64] A senior business consultant, who had been employed at Investec for a significant period at the time, was deeply involved with the iterative development and refinement of the propositions.

[65] The boundaries between the 'levels' of roles are not exact; therefore, the claim is not specific.

[66] For example: business analysis, system development, IT infrastructure, business architecture, training, marketing, testing, deployment, etc.

Of the 21 participants, fourteen had completed formal tertiary education[67], including twelve bachelor's degrees and three master's degrees. Of the seven participants for whom no tertiary education is listed, four had completed adequately accredited project management qualifications.

The sample is assumed, with reasonable confidence, to be adequate.

2.6.2.2 Validation Sessions

It was estimated that an hour-long one-on-one meeting would be required for a useful validation session. The meeting would be structured to include

- Ten to fifteen minutes of settling in at the meeting venue and having general conversation.
- About 30 minutes to present the Multi-Methodology System.
- Five to ten minutes to answer a respondent's questions for clarification.
- Five minutes to complete the questionnaire
- A couple of minutes for freeform feedback before closing the session.

A detailed PowerPoint presentation, including diagrams similar to those in section 2.6.1, was created to aid the validation. The propositions were presented by explaining the application of the Multi-Methodology System to a project. The application of the Multi-Methodology System was concluded to be the only feasible means of presenting the propositions. Time constraints would not permit covering the detail of the developing the design requirements and the application of Systems Thinking principles in doing so. The argument was: If the practitioner approves of the what the Multi-Methodology System aims to enable, and how it claims to do so, then the underlying principles and the application thereof during the design is validated, and *vice versa*.

Presenting the application of the Multi-Methodology System revolved around the Clustering of Project Work, the Network Arrangement of Project Work, and the Methodology Comparison Tool & Guide. The Clustering and Network Arrange of Project Work was presented as a single proposition, referred to as the Cluster-Network Approach, during the validation. The Methodology Comparison Tool & Guide was presented as the Methodology Selection Tool – this was the name of the proposition at the time. The presentation of these two propositions were assumed to adequately explain the application of the Multi-Methodology System, and could feasibly be presented in a single session.

[67] Education completed at schools for which adequate accreditation could not be verified by time of writing, were excluded from the sum. The same standard was applied to 'Project Management Qualifications' – if the accreditation of the granting institution could not be verified at time of writing, the qualification was excluded from the sum. The totals stated may be considered conservative.

The Viable Temporary System Model of the project was not presented due to its theoretical nature and the conclusion that the application of the two presented propositions imply the function of the model in a practical sense.

2.6.2.3 Questionnaire Design

The questionnaire was designed to be as simple as possible and to gather simple, quantifiable feedback. All participants had adequately populated LinkedIn profiles, therefore participants' experience and educational details could be gathered outside of the validation session.

The questions were designed to provide the essential feedback: do the propositions make sense, do they seem implementable, and do they seem useful? The questions were:

1. Do you feel that you understood the Cluster-Network Approach, as explained?
2. Do you feel that you understood the Methodology Selection Tool, as explained?
3. Do you think that the Cluster-Network Approach[68] is theoretically and conceptually sound?
4. Do you think that the Methodology Selection Tool is theoretically and conceptually sound?
5. Do you feel that the Cluster-Network Approach is implementable?
6. Do you feel that the Methodology Selection Tool is implementable?
7. Do you think that these propositions can be used to create unique methodologies for individual projects?
8. Do you think that the implementation and use of these propositions can aid risk management?

Participants were encouraged to give any feedback that they wished to share, which was audio-recorded. Participants were requested to eventually commit to exact answers which could then be quantified. The exact answers required a choice from a simple Likert-scale. Participants could either choose 'Yes' (agree), 'Indifferent', or 'No' (disagree). This approach enabled the mining of valuable qualitative feedback to the questions and propositions, by extension, and at the end of providing qualitative feedback to the question, the participant was in a better position to make an exact choice. The scale was purposefully designed to be simple, by only containing three choices. This forced the participant to commit to a rejection, for example, instead of being able to make a soft choice, such as 'somewhat disagree'; or to commit to an 'indifferent' instead of choosing 'somewhat agree'. In these cases, valuable qualitative feedback accompanied the choice, and opportunities for clarification emerged.

The first two questions were intended to motivate participants to ask for clarification where uncertainties remained. It was stressed, invariably, that the answers to the two questions of understanding were not a reflection of the participant's ability to grasp the ideas presented,

[68] The 'Clustering of Project Work' and the 'Network-Arrangement of Project Work' propositions were presented as a single proposition during the validation.

but that it was rather a reflection of the researcher's ability to explain the propositions. Every participant answered that they had understood the presented propositions.

The following questions sought to determine whether the propositions made sense to the participants and to what extent practical application of the propositions were deemed possible and useful.

The third and fourth questions sought to establish whether the propositions made theoretical and conceptual sense. These two elements of the questions, in hindsight, should have been split. For some practitioners, a sound concept is expected to be readily implementable within their context.

The fifth and sixth questions were asked to determine if the propositions were deemed, in broad terms, as implementable in practice.

The seventh question delves deeper. The propositions were designed, in the first place, to be presented as a framework that can be used in the customization of unique project management methodologies. The participant has to undertake a richer thought experiment to determine whether the propositions could serve their core purpose in practice.

They eighth question required a further leap and was included as a control question. Following the way in which the propositions were presented during the validation sessions, there was a strong likelihood that a positive answer to this question would depend on at least one of the following two prerequisites: the participant would have needed to, autonomously, derived the risk-management possibilities contained in the 'network' part of the Cluster-Network Approach (1) and/or the participant would've needed to view project management as a risk management toolkit in essence and also be convinced of the value that the propositions could add to project management (2). It would likely be illogical to give a positive answer to question eight, if one had not reacted positively to the preceding questions.

The likelihood of the two prerequisites being met was assumed to be less than one, and it was expected that honest, perceptive and attentive participants would, on average, respond less positively to this question than to the preceding ones. If there was no significant difference, the authenticity of the feedback would have been questionable.

This allowed the researcher to perform a sense-check on the provided information and the state of mind of the participant. As a positive externality, it was valuable to determine which proportion of the sample saw project management as risk management.

2.6.3 The Execution of the Validation Sessions

The validation sessions consisted of fourteen one-on-one sessions, two sessions with two participants, and one with three. The propositions were explained by means of applying the propositions to a hypothetical project, by explaining in conjunction with real world example and visual illustration, how it could be used and how it would work. Such a session, when

one-on-one, could be completed in half an hour. The sessions lasted more than an hour in most cases, where questions for clarification became mutually beneficial and intriguing conversations.

In respect of practitioners' time, the sessions were conducted wherever the participant preferred. Venues include meeting rooms, pause areas, at the respondent's desk in an open plan office, and restaurants. The feedback and Q&A parts of the sessions were audio recorded.

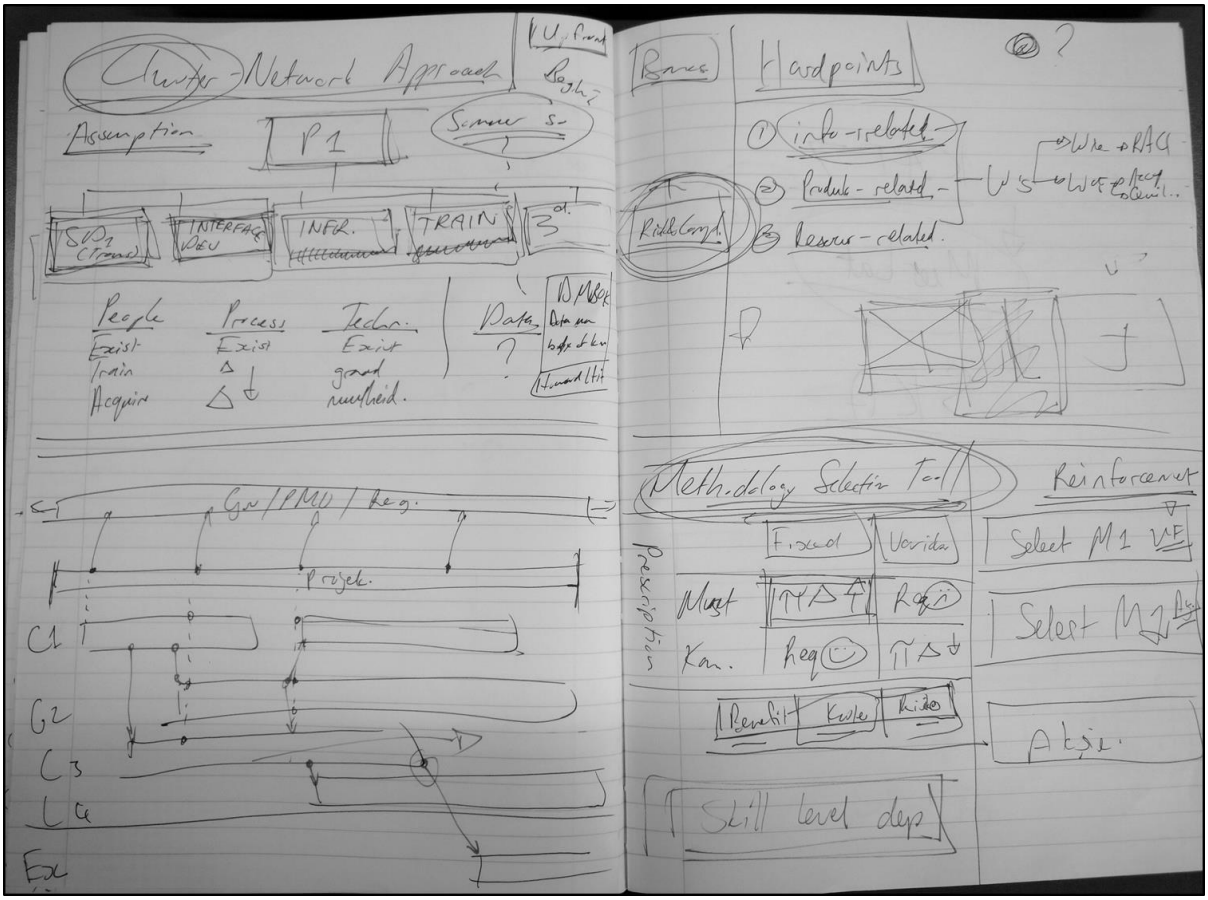

Figure 2.6.3-1: Example of Validation Session Illustration (Counter Book)

The first validation session was conducted in a meeting room, displaying the PowerPoint presentation, containing much of the figures used in this document, with overhead projection. The participant was a programme manager. The presentation was not successful. In answering the participant's questions after the presentation, the Multi-Methodology System was explained again by recreating the diagrams with a board marker on a flipchart. This explanation was successful. The digital presentation was shelved and for the remainder of the validation the propositions were presented by recreation on a whiteboard, flipchart, or two A4 pages in a counter book. Figure 2.6.3-1 and Figure 2.6.3-2 are examples.

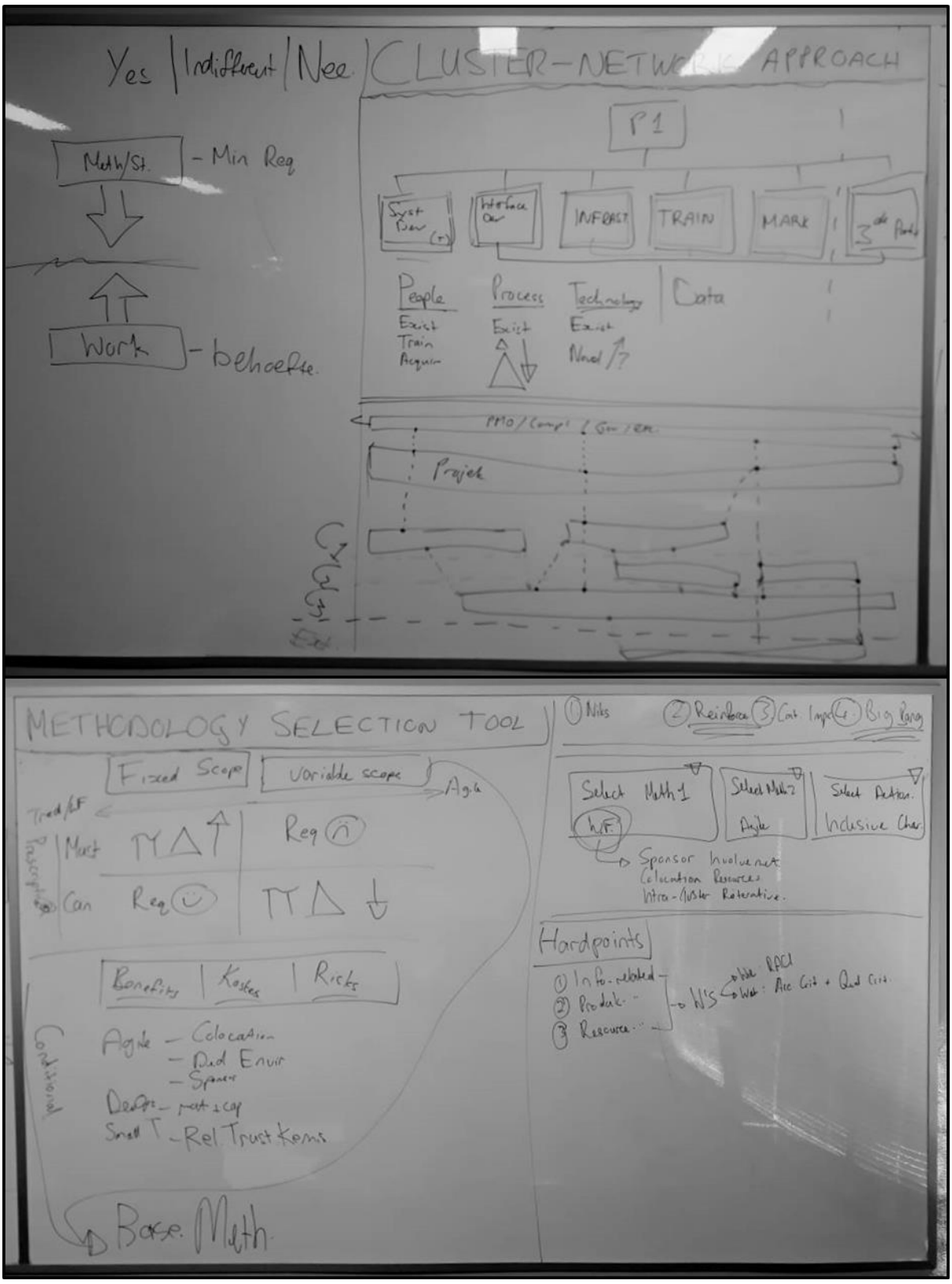

Figure 2.6.3-2: Example of Validation Session Illustration (Whiteboard)

2.6.4 Results of the Validation of the Propositions

In Figure 2.6.4-1 the feedback of the entire sample is summarized. Responses to the questions regarding participants' understanding of the propositions are omitted from the following figures. All participants indicated that the propositions were comprehensible as presented during the validation sessions.

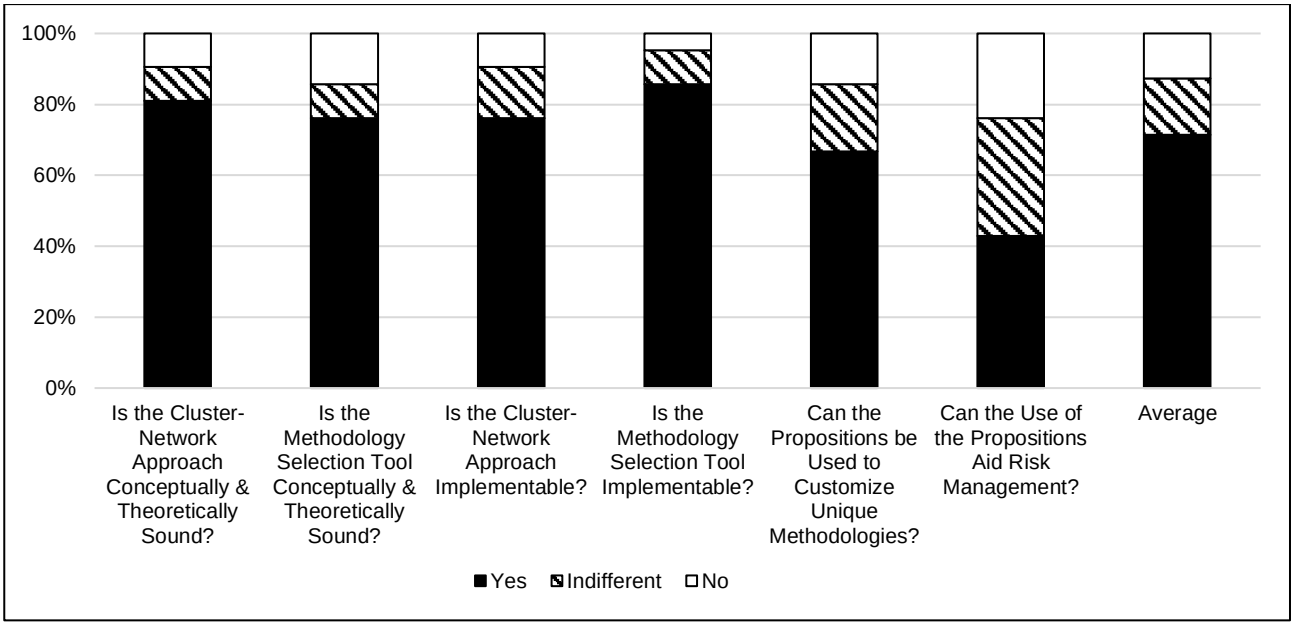

Figure 2.6.4-1: Validation Feedback: Full Sample

The full-sample feedback indicates that the overwhelming majority of participants perceived the propositions as conceptually sound and implementable. A two-thirds majority of the participants perceived the propositions as utilizable in the customization of unique project management methodologies for the individual project. The averaged responses to the related five questions naturally indicate strongly favourable perceptions of the propositions, while a statistically significant proportion of the feedback indicated indifference (12%) and disagreement (10%).

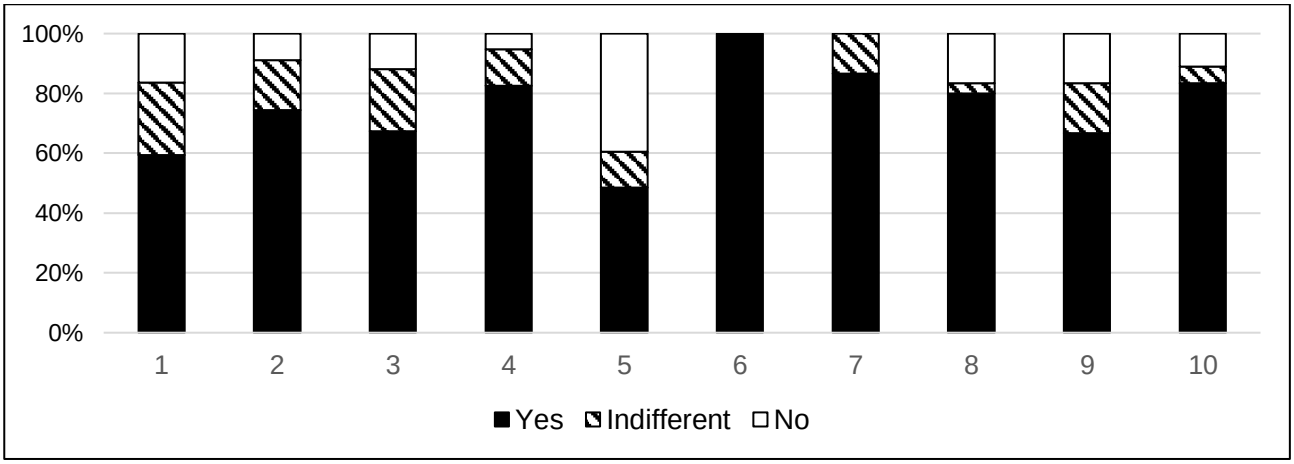

Figure 2.6.4-2: Validation Feedback per Entity

Responses to the control question, regarding the usefulness of the propositions for risk management, varied significantly from responses to the other questions in the questionnaire.

With the exception of entities five and six (Figure 2.6.4-2, each column representing an entity like a bank or service provider to the industry), feedback regarding the propositions were similar across all entities and largely positive. The exception lies with entities five and six. The amounts of participants tied to these entities were less than it was for all but one of the other entities, hence the skewed outcome, neither the positive nor negative variation are inexplicable outliers.

An interesting picture emerges when the feedback received per participant is ordered chronologically (Figure 2.6.4-3, each column representing from chronologically ordered validation sessions). Feedback from participants who attended shared sessions, are shown individually, for example, participants thirteen and fourteen shared a session.

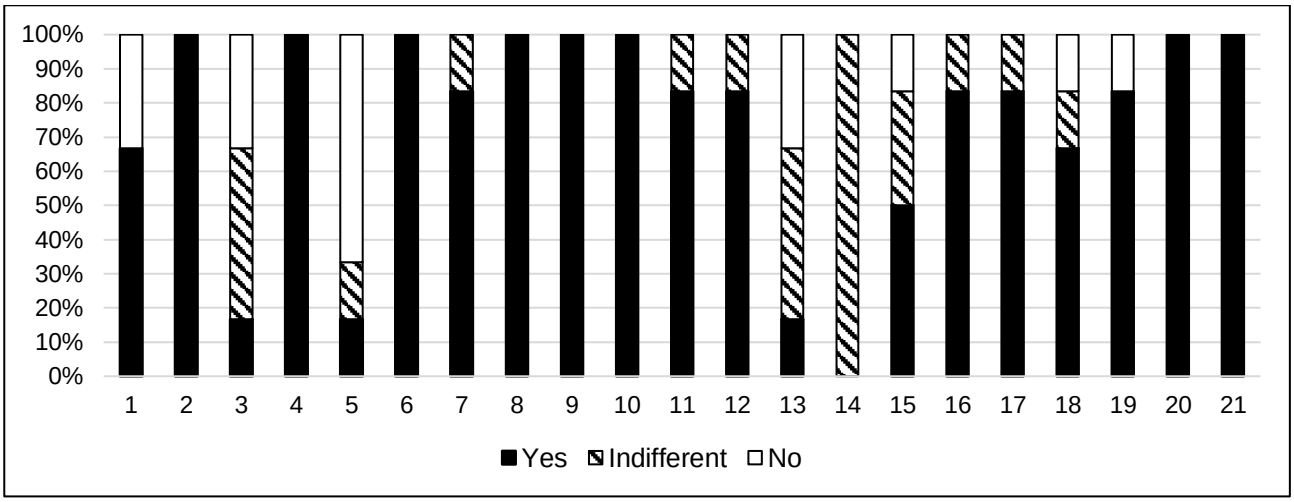

Figure 2.6.4-3: Feedback of Each Participant in Chronological Order

It is noteworthy that there is great variation in the feedback of the first six participants. These sessions were completed during the first two days of the week that was allotted to the presentation of the propositions. The scheduling caused for tight timelines and too great distances to be covered between validation venues during business-hours traffic. Once the researcher had a good grasp of how to present the propositions effectively, feedback was more even, until the session with participant thirteen and fourteen. It emerged that participants thirteen and fourteen are the custodians, in the entity where they are employed, of the organisational project management methodology, which they also introduced to the entity and implemented. It is not surprising that a proposition that opposes the adoption of a single methodology was not perceived favourably.

The feedback obtained by the questionnaires indicated largely favourable perceptions of the propositions, and was characterized by normal variation.

2.6.5 Validation Results & the Hypotheses

The structured feedback produced by the validation indicates an overwhelmingly positive reception of the propositions – both individually and as a whole, and for conceptual soundness, expected implementability, and expected utility.

The only common critical feedback revolved around participants' desire to see the propositions in action in practice, rather than scrutinizing the presentation of the propositions.

During the validations, four separate entities requested further conversations entailing the possible adoption of portions of the propositions. The Methodology Comparison Tool garnered the widest attention and is a need that demands priority. One entity wishes to explore the 'hardpoints' approach to the network-arrangement of project work. A consultancy that acts as a third-party service provider to the banking industry is eager to incorporate the perspective on project management, as contained in the propositions, into their professional arsenal. The validation preceded the pandemic, and the advent of Covid-19 unfortunately brought an abrupt halt to these discussions.

The structured feedback allows for the case to be made that the design of the Multi-Methodology System was positively validated and warrants further development with the aim to produce offerings that can be implemented in practice. As such, the hypotheses that the execution of the study and the design of the propositions are valuable to the theory and practice of project management are not rejected, and the null hypotheses are not accepted.

However, the execution of the research study and the design of the propositions can only be adjudged to be ultimately valuable to the theory and practice of project management once it has been implemented and shown successful results in practice. With the creation of the Hegel Circle, it was attempted to build falsifiability into a soft paradigm research approach. It was not possible to build rigorous falsifiability into the execution of this research study. Rigorous falsifiability could have been achieved if implementation and measurement was possible before the submission of this text.

For this reason, the strongest comment on the hypotheses is that they have not been rejected, and the null hypotheses have not been confirmed. This is a weak statement in the sense that implementation and measurement may produce the acceptance of the null hypotheses and the rejection of the hypotheses. Therefore, it is concluded that execution of the research study and the design of the propositions are valuable to the theory and practice of project management, but the conclusion does not stand indefinitely.

2.6.6 Conclusion

The Multi-Methodology System as an approach to IT project management in SA banking was positively validated by project management practitioners in the relevant context. This was done by explaining the application of this proposition to a project, and requesting

feedback regarding the perceived soundness of the concept, and its expected implementability and usefulness.

Further to the formal validation, selected practitioners were involved from the onset of the study, and throughout, in order to allow for the sense-checking of observations, and to provide feedback and input. Academics from the local institution and partnering institutions were also involved in informal presentation and feedback sessions; and the 1st iteration propositions were presented and discussed and a chapter meeting of the PMI. Informal feedback was continuously applied in order to fine-tune the propositions of the study. Where possible, practitioners and peers were met with in person[69] in order to present and discuss the propositions. Where physical meetings were not possible, visual aids were sent by email and discussions occurred telephonically or via email.

The most important single criticism and feedback, gathered during a meeting with peers from the local institution and a peer[70] from a partnering institution is presented in this section.

The Multi-Methodology System, during the early iterations, were called the Multi-Level Model and bore a decidedly Gant Chart-like rationale and look when illustrated. This was criticized for the arbitrary hierarchy implied by the 'levels'; and for the pre-emptive, and prescriptive, descriptions of the components of the project. It was after that criticism that the research and creative direction changed toward designing for a system that imitated nature and responds to the demands of the situation.

Another peer-input[71] relates to terming the Multi-Methodology System as a response to a situation instead of an 'emergent' result from the situation.

This criticism harmonizes with the findings of the further background research of section 2.3.4 in chapter 2.3.

Statistical analyses were considered by which the hypotheses could perhaps be tested at a range of significance levels. However, given the Likert Scale feedback and the sample being a small one of expert practitioners.

The 'no' responses can however be investigated with the purpose of searching for a rejection of the Multi-Methodology System in principle (or theory).

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[69] This feedback gathering for the first iteration occurred before the onset of the Covid-19 pandemic.

[70] The peer referred to is Dr E. Lutters, of the University of Twente. Earlier versions of the document did not contain 'acknowledgements' and therefore the opportunity was taken here. Along with my supervisor, Prof C.S.L. Schutte, Dr Lutters provided the most valuable feedback and criticisms.

[71] The peer referred to is Dr S.J. Whitty, of the University of South Queensland. Other than the useful criticism of terminology used at the time, Dr Whitty and collaborators have produced some of the most valuable research relating to criticisms of traditional approaches to project management, like Prince2, and applications of Heideggerian phenomenology to the study of projects and project management.

There was a total of fifteen ‘no’ responses from the 21 participants, referring to Figure 2.6.6-1.

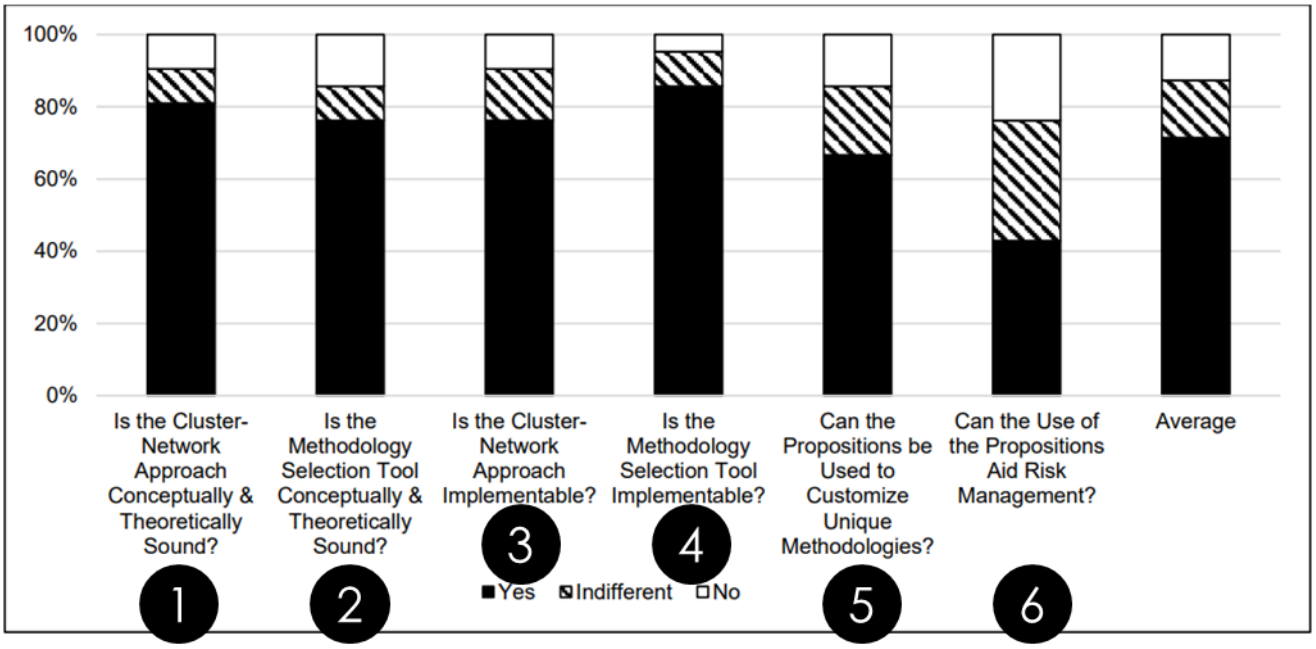


Figure 2.6.6-1: The No’s

Three of the ‘no’s’ related to bar 6 in Figure 2.6.6-1. This was a ‘control question’ – risk management and the role of the Multi-Methodology System in risk management was not directly discussed. There were two reasons for this – it gauged the practitioners’ linking of project management and risk management, and it was expected that the feedback to this question would differ significantly with the feedback on the other questions. The fact that the feedback represented by bar six is significantly different supports the case for respondents interpreting the presentation of the proposition and answering honestly and intelligibly.

The Methodology Comparison/Selection Tool, for which feedback is represented in bars two and four in Figure 2.6.6-1, five ‘no’s’ were returned. Three out of the four relevant respondents correspond to entity 5 in Figure 2.6.4-2 (this entity went all-in on an organization-wide implementation of SAFe), and another is a programme manager in an entity that uses a minimum governance approach. Whereas the idea of comparing and hybridizing different methodologies present an ideological oddity to these respondents, no convincing theoretical or technical challenges to methodology comparison and hybridization were offered.

The two ‘no’s’ relating to each of bars one and three in Figure 2.6.6-1 were justified by respondents wanting to see the Multi-Methodology System in practice instead of answering a theoretical question. This result is understandable to an extent in a practiced field like project management, but did miss the intention of the question. The two ‘no’s’ returned for the question for which feedback is represented by bar five in Figure 2.6.6-1 were predicated on the same desire to see implementation in practice first before contemplating the likely outcome.

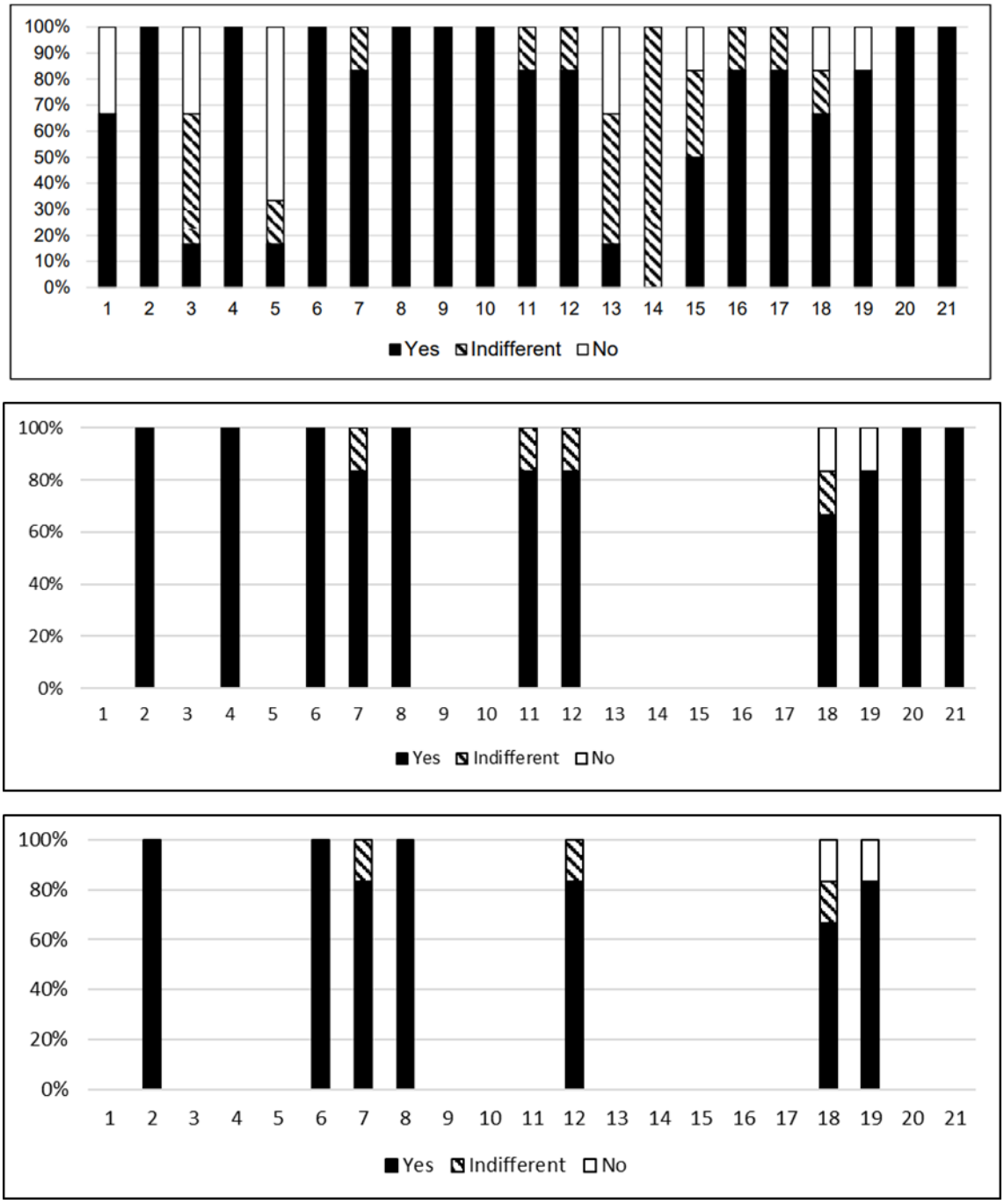


Figure 2.6.6-2: Identity, Interpretation, and Response

A peculiarity in the feedback emerges when the feedback is filtered for the broad 'identity group' – Afrikaans male – to which the authoring researcher belongs, represented by the centre bar chart in Figure 2.6.6-2. The only two 'no's' returned by this group are for the 'control question'. The reasons for this significant difference can be speculated about at length, but it is certainly the case that it is easier to explain a proposition in your mother tongue to persons with whom the researcher shares some commonalities and in whose company the presenter can be at maximum ease.

The bottom bar chart in Figure 2.6.6-2 further filters the identity group for respondents who are former colleagues or were befriended, and shows no significant difference.

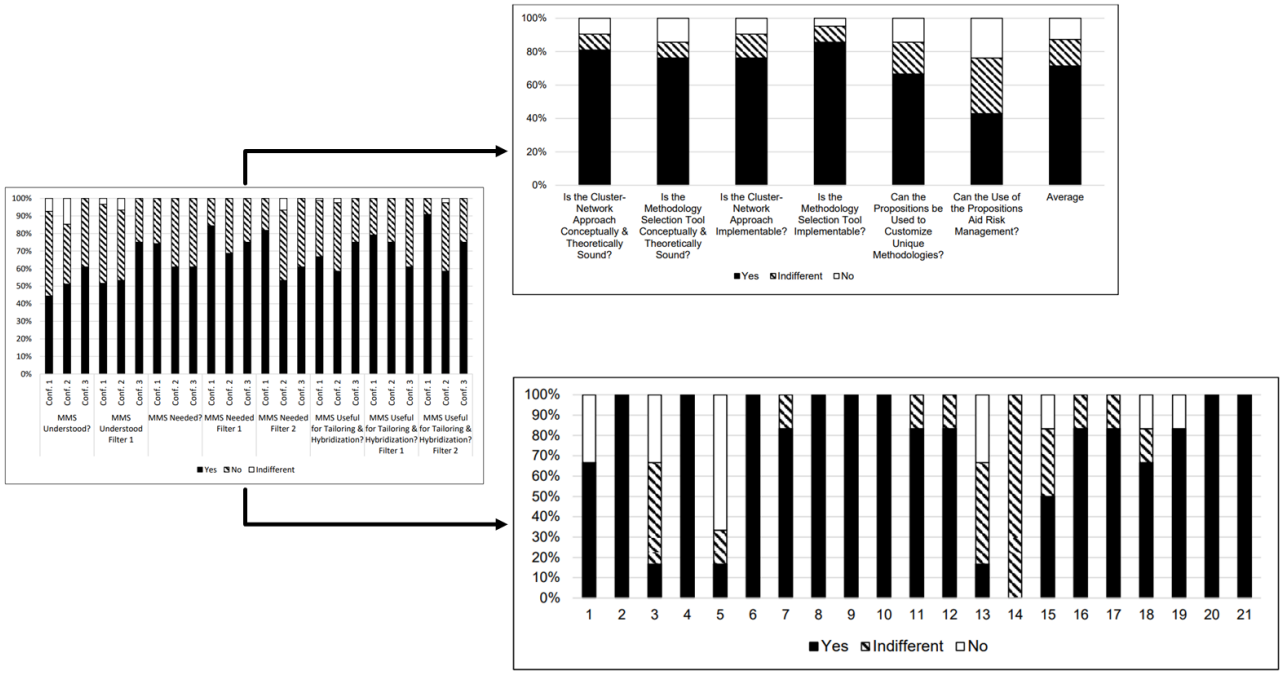


Figure 2.6.6-3: The Comfort Hypothesis

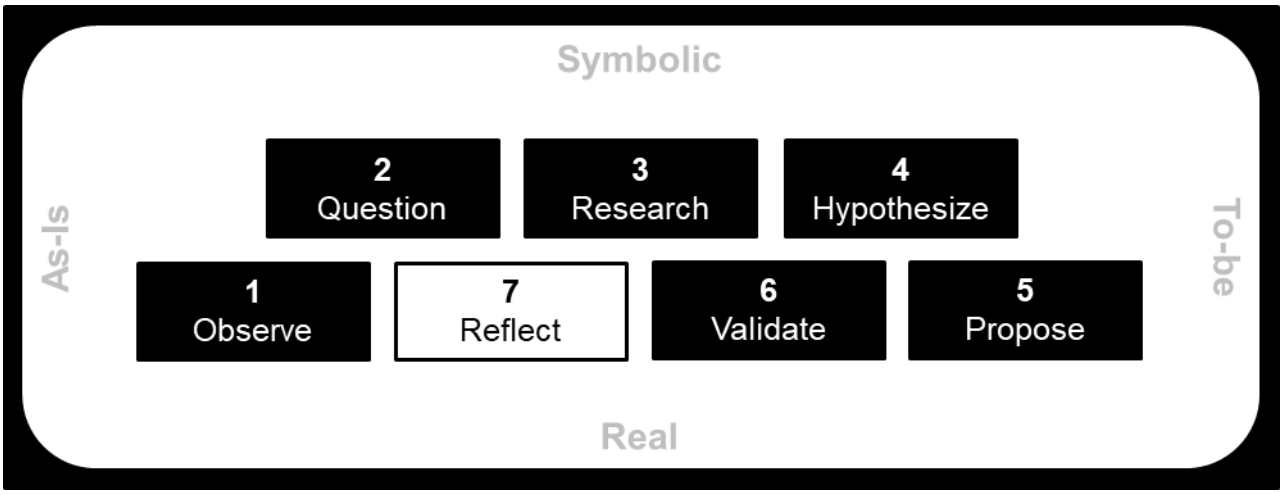
Further to the idea that the feedback is more positive when the presenter is at ease, Figure 2.6.6-3 shows how the feedback improved from the concept proposition (leftmost bar chart) to the eventual proposition's feedback (top-right) and the improvement in feedback chronologically (right-bottom). There is also an inherent risk, however, the presenter may become a better salesman of the proposition instead of presenting the proposition more accurately. For this reason the ultimate test to follow this research would be replication and/or implementation of the proposition in practice.

As far as the potential value of the overall study is concerned, informal feedback overwhelmingly was in favour of the continuation of the development of the Multi-Methodology System for implementation in practice.

2.7 Reflect – Conclusions on the Value & Execution of the Study, and Future Work

"Science no longer is in the position of observer of nature, but rather recognizes itself as part of the interplay between man and nature. The scientific method ... changes and transforms its object: the procedure can no longer keep its distance from the object."

Werner Heisenberg



SA's major banks have implemented significant changes to their IT project management approaches over the last decade and are likely to continue to do so in the future. Attempting to implement an IT project management approach that leads to prescriptive methodological comes at a risk and can be expected to periodically result in further significant changes being required. The Multi-Methodology System presents an approach that offers variety and adaptability, and which allow for the methodological choices to be a controlled response to the characteristics and needs of the organisation and the project. The design requirements for the Multi-Methodology System were validated by a sample of expert IT project practitioners and stakeholders in SA's major banks.

The purpose of the study was ultimately to develop and validate the design requirements for the Multi-Methodology System. This was a response to the final problem statement:

- Existing approaches to project management does not adequately cater for the intricacies of large, complex information technology projects in SA banking.
- Principles of Systems Thinking, like adaptability, variety, and viability is not catered for by existing approaches to project management.
- No adequate tool, framework, or other resource for the comparison of project management approaches, methodologies, processes, and the like could be identified.

However, the research process was ignited by observations regarding the periodic implementation of significant changes to IT project management approaches in SA Banks,

uncertainty over the benefits stemming from these changes, and the prevalent project management approach and methodology dogmatism amongst practitioners. After the investigation of these observations, it was concluded that theory was needed to describe empirical findings from practice, and to develop a methodological system as an approach to IT project management in SA banking which would respond to needs and possibilities instead of prescribing management methods and processes.

The contributions of the study consist of the theory produced which explains recent empirical findings concerning the performance of project management methodologies, the validated propositions of the study, the opportunities identified for further research, and the application of a novel research approach during the execution of the study.

Whereas substantial efforts had been invested and now documented – in part by design and in part by constraint – this study constitutes a research circle or two among the many research iterations required for the further development of IT project management approaches and methodologies in complex settings, like SA banking. There are positive aspects to highlight; there were objectives that were not feasible within the constraints of the study; the research approach was adequately applied in some cases; in other cases, the application or approach was deficient; and it is concluded that a significant foundation was laid for the bulk of the work which lies ahead.

The next sections cover the inferences drawn from the research, the results and proposals (2.7.1); the contributions brought forth by the study (2.7.2); the opportunities for future research (2.7.3, 2.7.4, 2.7.5); and reflections on the application of the Hegel Circle research approach (2.7.6).

Referring to the Hegel Circle, this step ties claims as to the successes and shortcomings of the research study together and describes the situation of this study within the body of knowledge and the “schools of thought.” Whereas the propositions and validation sought to bring the abstract closer to reality, report of the study and reflections on it seeks to create the symbolised version of the created knowledge and presenting it in such a way that it may be shared, stored, and utilised.

2.7.1 Inferences, Results, and Proposals

The main inferences that can be drawn from the study are:

- The lack of variety that can be provided by a predetermined project management approach and methodology constitutes the systems-theoretical explanation for agile approaches and methodologies not outperforming traditional approaches and methodologies across the entire range of success factors (sections 2.3.5 & 2.3.6).
- Improved IT project management approaches and methodologies in SA banking should present variety and adaptability (as opposed to predetermination) to enable the approach and methodology to form as a response to the characteristics of the project and the organisation (sections 2.3.5 & 2.3.6).

- The further development of the Multi-Methodology System is justified (chapter 2.6).
- The argument that Hybrid (and mixed methods) are not a transition point, but *here to stay* (Gemino, Horner Reich and Serrador, 2021), is supported by theory (section 2.3.5) and the validation of the design requirements for the Multi-Methodology System (chapter 2.6).
- The rationale behind the Multi-Methodology System is accepted by expert practitioners and peers (section 0 and chapter 2.6).

The main results of the study were:

- The design requirements proposed for the Multi-Methodology System were accepted (and not rejected) by expert practitioners or peers.
- The further development of the Multi-Methodology System with the goal of implementation in practice is justified (and not rejected).
- Expert practitioners showed particular interest in the Methodology Comparison Tool a resource that can be utilized for the comparison of project management methodologies, approaches, methods, processes, guides, and the like.

These results were the result of the validation of the design requirements, as formally described in section 0 and chapter 2.6, and the continuous engagement with expert practitioners and peers throughout the execution of the study.

The main proposals for future research that stem from this research study are:

- The further development of the Multi-Methodology System with the goal of implementation in practice.
- The further development of the Hegel Circle as a research approach.

2.7.2 Contributions Brought Forth by the Study

The propositions of the study present contributions to the field of project management in response to recent empirical findings and the development of project management approach research.

The progression from traditional to agile and, increasingly, hybrid and mixed-method approaches to project management in general, and IT project management in particular, has been empirically described (Komus, 2014, 2017, 2020; Vijayasarathy and Butler, 2016a; Marinho *et al.*, 2019; Khoza and Marnewick, 2020; Komus and Kuberg, 2020; Gemino, Horner Reich and Serrador, 2021). There can be little doubt that hybrid and mixed-method approaches are here to stay (Gemino, Horner Reich and Serrador, 2021), and that agile, hybrid and mixed-method approaches enable significantly improved project success, averaged across the investigated indicators, over traditional approaches (Serrador and Pinto, 2015; Khoza and Marnewick, 2020; Gemino, Horner Reich and Serrador, 2021).

Having benefited from extensive empirical investigations published over the last five years, there are the need and opportunity for the development of project management methodology

and approach theory to describe the causes of the empirical findings; and the need and opportunity to develop the methodological capabilities to enhance the application of project management approaches in practice.

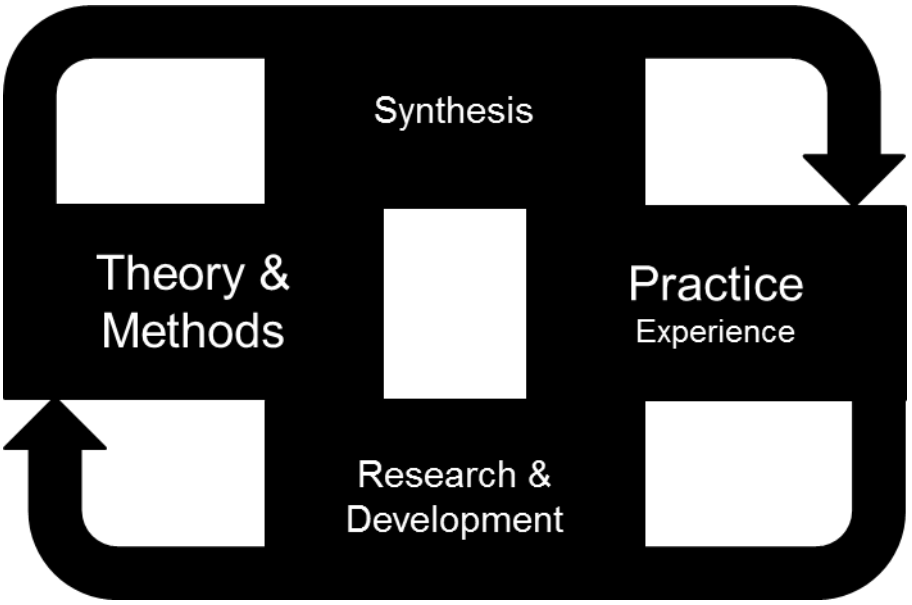


Figure 2.7.2-1: The Theory-Practice Interplay (Adapted (Winter and Smith, 2006)*)*

The adage attributed to John Maynard Keynes, relating to theory leading to practice, and practice generating theory, is adapted in Figure 2.7.2-1. It may be argued that theory does naturally lead to practice, and that practice naturally generates theory. However, it can also be argued that not all things which happen naturally does so in the optimal fashion. As a case in point, the practice of method-tailoring for IT project management generated tacit and organization-specific theories (Conboy and Fitzgerald, 2007). For this reason a drive to generalize method-tailoring theory ensued at the start of the previous decade (Conboy and Fitzgerald, 2010; Kalus and Kuhrmann, 2013). This initiative gained a measure of momentum (McClure, 2019) and the PMI called for research specifically pertaining to hybrid method tailoring towards the end of the last decade (Project Management Institute, 2017). This progression, referring again to Figure 2.7.2-1, shows to the concerted effort required to produce generalizable theories and methods. It goes without saying that the equivalent applies to the synthesis by which theories and methods are made adoptable in unique contexts.

Recent IT project management approach and methodology research having been heavily biased towards quantifiable aspects, such as project success factors, leave the wants of 2017 yet wanted. The method-tailoring literature surveys, both published (McClure, 2019) and conducted for this study, did not identify an adequate response to the PMI's 2017 (Project Management Institute, 2017) call for research.

These trees are, however, also a forest. The referenced empirical results relating to the hybrid and mixed-methods turn in project management approaches, and the specific (Khoza and Marnewick, 2020; S. K. McGrath and Whitty, 2020b) and more general (Hodgson and Briand, 2013; Bierwolf, 2016; Lindsjørn *et al.*, 2016a; Recker *et al.*, 2017; Saeed, 2017;

Marinho *et al.*, 2019) challenges noted where agile approaches to project management are followed, beg the following questions:

- What are the reasons, or the theory, that can reliably explain the move, not only from traditional, but also from agile to hybrid and mixed method approaches to IT project management?
- How shall the theoretical and methodological underpinnings of IT project management approaches be developed for the benefit of practice?

The value of this study to the theory of IT project management methodologies and approaches is brought about by the Systems Thinking assessment (section 2.3.5) which both identified the limiting factors of predetermined project management approaches and also advised the development of the design requirements for the Multi-Methodology System (chapter 2.5) to allow for variety, adaptability, and control. Furthermore, a more holistic and applicable perspective of the complex IT project in a large organization, like SA's major banks, is derived from the VSM.

The value of this study to the research field and fellow researchers follows from the proposed directives for further research, and from the claimed enrichment of the theory of IT project management methodology and approach. If the theoretical additions are reliable, the foundations have been reinforced. Be these additions unreliable, it is hoped that productive rebuttals may be spurred to the benefit of theory, research, and practice.

The benefit of the Multi-Methodology System to the application of project management methodologies and approaches to IT in SA banking is twofold. In the first place, immediately useful requirements for the comparison and hybridization of project management methodologies and approaches are provided. Although requiring considerable intervention and commitment, the Clustering and Network Arrangement of portions of project work delivery will provide for a comprehensive intra-project and inter-project dependency profile. This dependency profile will also enable portfolio-wide planning, and risk and issue impact assessment.

2.7.2.1 The Multi-Methodology System for IT Project Management in SA Banking

The Viable Temporary System Model (section 2.5) provides an improved model of the project within the organization. This model explains the situation of the project within the organization and is scalable. Towards the end of this study and the case in practice, it explains and enables the application of multiple methodologies in a single project. The presentation of the propositions, during the validation (chapter 2.6) of the propositions, applied the possibilities presented by the Viable Temporary System Model, and was favourably validated by the project practitioners who partook in the validation (section 2.6.4).

Furthermore, the Viable Temporary System Model offers a theoretical perspective on the empirical findings relating to agile not performing better than traditional approaches for all

factors analysed (section 2.2.2.1). The theory is that a single, predetermined project management approach can never provide the requisite variety of system responses demanded from project management in a complex setting. Referring to Figure 2.7.2-1, the presentation of the Viable Temporary System Model constitutes a valuable theory-practice interplay.

The VSM is used as a means of testing organisational viability (Jackson, 2003), and if the Viable Temporary System Model is accepted for the project, it is expected that it can be applied to the same ends for the temporary organization.

The Clustering of Project Work and the Methodology Comparison Tool & guide present a conglomerate of theory, method, and tool for application to the hybridization of Multi-Methodology Systems. The Network Arrangement of project work represents an enhanced take on the Gant Chart. All these propositions were favourably validated by project practitioners in SA banking (section 2.6.4).

2.7.2.2 Proposition Value & Novelty in Conclusion

The second, and perhaps less obviously direct, value of the Multi-Methodology System to practice and practitioners, is that it attempts to formalize and improve the processes which naturally result from self-organization, instead of fitting the organization to a 'best practice'. The retrofitting of the organization to a chosen practice is common in IT in SA, and has been shown to fail (Marnewick and Lessing Labuschagne, 2011; Marnewick, 2017).

The idea that a large organization can overhaul decades' worth of evolution at a whim to adopt a radically different practice for a complex function, like IT project delivery, echoes a most damaging misinterpretation of Karl Marx. In his Feuerbach Thesis Eleven the *"…es kömmt drauf an, sie zu verändern..."* is often misapplied as advocating for the precedence of enacting change over the establishment of interpretation. The logical consistency of the thesis has been challenged by the likes of Martin Heidegger, and the proper interpretation remains disputed (Pausch, 2018), not to mention the translation. What is not unclear though, is that Marx's historicism stresses the deep understanding of history and the *Zeitgeist* as the foundation for indeed proceeding to a struggle for change which is justified by an objective and practically useful philosophy (West, 1991).

When it comes to the adoption of new project management approaches or the implementation of new management information systems, however, traces of the populist application of Thesis Eleven appears apparent, spurring change for the sake of change, justified by positing that any shift beats stasis.

In response to this remark and the inadequate benefit tracking following the adoption of project management approach changes (Marnewick, 2017; S. K. McGrath and Whitty, 2020b), the Multi-Methodology System is designed to formalize processes which evolved naturally, and only thereafter provide for improvements. This approach is taken to increase the potential for intervention success, and to reduce change fatigue among the project stakeholders who bear the brunt of change-impacts.

Concluding the value add to the application IT project management methodologies in SA banking, design requirements are produced from technical specifications can be derived for future implementation.

The area under investigation is limited to IT project management in SA banking, however, project management principles have repeatedly been found to be general across industries and geographical regions – this is elaborated on in Appendix A – The Generality of PM Principles.

It has been argued throughout this document that no claim to inventive novelty is made, but rather that the formalisation and theorisation of that which is already the case do exhibit innovative novelty[72] (Alvesson and Sandberg, 2013; Stentoft and Rajkumar, 2018) (Zhou *et al.*, 2016) (Sovacool, Axsen and Sorrell, 2018) (Wieringa and Heerkens, 2006; Järvinen, 2007; Prokop, Regibeau and Rockett, 2010; McKiernan and Tsui, 2019; Burghardt and Bodansky, 2021). The Methodology Comparison Tool is also an innovative novel contribution – a tool providing the information and functionality described for the Methodology Comparison Tool was searched for when the study commenced, to be used as an input. Whereas it seems unlikely and integrated frameworks (Praxis Framework, 2014) and multiple approach overviews (Axelos, 2018) have been published in book form, a similar tool could not be identified through investigation.

2.7.3 Further Development & Implementation of Propositions

Three main themes could be identified from the unstructured feedback provided during the validation sessions by project practitioners who partook in the validation of the propositions:

- Practitioners showed great interest in the Methodology Comparison Tool as an input to the tailoring and hybridization of project management approaches.
- Practitioners would have preferred to judge the application of the Multi-Methodology System in practice, instead of having to imagine its application.
- Some practitioners were concerned that the Multi-Methodology System overcomplicated the development of project management approaches, whereas a simplification and enablement of self-organization could hold the key to improved project management.

[72] Novelty is not unanimously accepted as a research requirement, because ‘novelty’ is a perception and ‘provable’ by simply modifying the writing style. Indeed, most management and project management journals demand an argument in favour of a newly submitted work containing this crypto characteristic. There have been arguments against emphasizing ‘novelty’ as a requirement for new research, but most importantly: Novelty says nothing about value, and, works of value must necessarily be innovative to an identifiable extent. As a reminder, the references are provided separately and in-text since Mendeley cannot cite from MS Word footnotes.

In response to the first point, the creation of a web-based and mobile application version of the Methodology Comparison Tool is a priority.

In response to the second point, it should be noted that implementation was on the cards prior to the onset of the Covid-19 pandemic. The next step is to further develop the Multi-Methodology System for implementation in practice.

Following from the first two points, the third point raises an important question. It is common for specialists in any field to overestimate the usefulness of their specific tools and knowledge, and the breadth and depth of its useful application. In Systems Thinking, *Total Systems Intervention* is the ultimate implementation of wholesale changes to an organization (Jackson, 2003). The implementation of far-reaching changes, while the project delivery function of the organization is expected to continue delivering existing and new projects, is risky. The question for future research is to enable the identification of the most optimal focus areas for change implementation.

When a process is changed, a justified change can fail if not optimally aimed. For example, the enforcement of strict governance has no positive effect if practitioners aren't trained and provided with enablers to adhere to the governance requirements. Similarly, the implementation of a management information system to support portfolio planning and management is useless unless the underlying processes produce adequate management information. However, the inverse also counts. Improving requirements gathering can have positive knock-on effects for its enablement of improved planning, necessitating greater client involvement, and leading to finer estimations.

2.7.4 Gaps: Research Objectives Not Met

Whereas the Multi-Methodology System can be applied to the hybridization of unique approaches to project management, there is a deeper question regarding the implementation of change that is not addressed. A 'Change Implementation Guide' was initially proposed for inclusion in the scope of this study.

The IT project delivery function as found in SA banks present complex challenges to the successful implementation of change. One of these challenges relates to the challenge of implementing a change to the project management approach while a multitude of active projects are at different stages completion. These projects are expected to progress without showing the impact of absorbing the implemented changes. An adequate proposition could not be formulated within the constraints of this research study.

Upon investigating the problem of implementing changes to the project management approach, it was found that while useful methods and guides for change management exists, the theoretical underpinnings are narrow and shallow. To state that practitioners are risk- and change averse, or change-fatigued, are tropes which are accepted as a self-evident in IT project management in SA banking. However, adequate theory as to change hesitancy was not identified during the investigation.

As a topic for future research, a theory of change has been developed. This theory will be further developed and scrutinized following the completion of this study. The inductive reasoning applied in the development of this theory, in summary, produced the derivation of the following propositions:

- The status quo is the result of a causal chain of decisions.
    - These decisions were rational to the decision maker, given the full context of the situation wherein the decisions were made.
    - The decision maker(s) may have been wrong, and may have been corrupt, but there was a rationale, however flawed, to the decision(s).
    - Those impacted by the decision(s), adapted to the impact(s) – whether by choice or coercion.
- The status quo may be ‘wrong’ or ‘bad’ or ‘suboptimal’ or ‘evil’, but the status quo neither justifies nor dismisses any proposed change.
- The status quo, however good or bad, is neither justified nor dismissed in the present – it rather is simply the fact of the matter.
- The onus rests on the proposer of the change to prove the justification of the change beyond reasonable doubt before the status quo should be changed.

From a more practical perspective, three means of absorbing extraordinary impacts have been conceptualized and will be further developed as an opportunity for future research. The implementation of change to an ongoing function is an example of an extraordinary impact.

When absorbing extraordinary impacts, it is proposed that the impact can be absorbed by a ‘Friction Zone’ or a ‘Flood Zone’ or a ‘Crumple Zone’; or a combination of the three.

The Friction Zone is a specialized function that the organization creates in order to help it absorb the temporary impact of an introduced change. Examples of these may be special control boards for the initiative by which the change is introduced, contracting short term, specialized resources, or providing specialized training to practitioners in order to be better equipped to absorb the change. It is a short-term function, and expendable.

The Flood Zone is an area of the organization which is identified as being able incur the damage following the absorbing of an adverse short-term impact. But, after absorbing the impact, the damage incurred can be repaired. An example of this would be when a client contact centre is instructed to only address queries relating to a present crisis. The risk of backlogging all other queries is incurred, expecting that the backlog can be cleared once the present crisis is resolved.

The Crumple Zone is that which the organization is willing to lose completely in order save the greater organization. An example of this would be decommissioning a product in need of an IT upgrade in order to apply the implicated resources elsewhere.

As with the Multi-Methodology System, it is argued that these principles are already applied in organizations, but the further research will focus on formalizing and improving the application of these principles.

2.7.5 Gaps: Requirements Identified En Via

Whilst developing the Multi-Methodology System, it became apparent that the hybridization of unique project management approaches and methodologies for the individual project would require a highly specialized role, a practitioner capable of driving the Viable Temporary System and its components which employ multiple methodologies.

This realization emerged against a peculiar backdrop – the role of the project manager is disputed at this time where IT project management is moving away from traditional approaches to project management.

It is proposed that the development of the scope and functions of the project manager is that the project manager would be the cross-functional integrator of the large complex project – the project manager is the role required to be able to make sense of the diverse nature of the delivery of the unique components of the project. The project manager of the large, complex project has always fulfilled this role; however, it has not been well enough described. Arguably this is the reason why it is assumed that the project management role can be replaced by that of, for example, a scrum master, and that project managers can be repurposed for such a role without great impact. This may be one of the reasons for Agile not outperforming Traditional approaches in factors analysed.

It is therefore proposed as a topic of future research that the role of the project manager is to be investigated as it pertains to large, complex projects; and that the differences between the roles and responsibilities between the project manager and other managers of delivery in the temporary organization should be investigated.

2.7.6 Reflections on the Application of the Hegel Circle as Research Approach

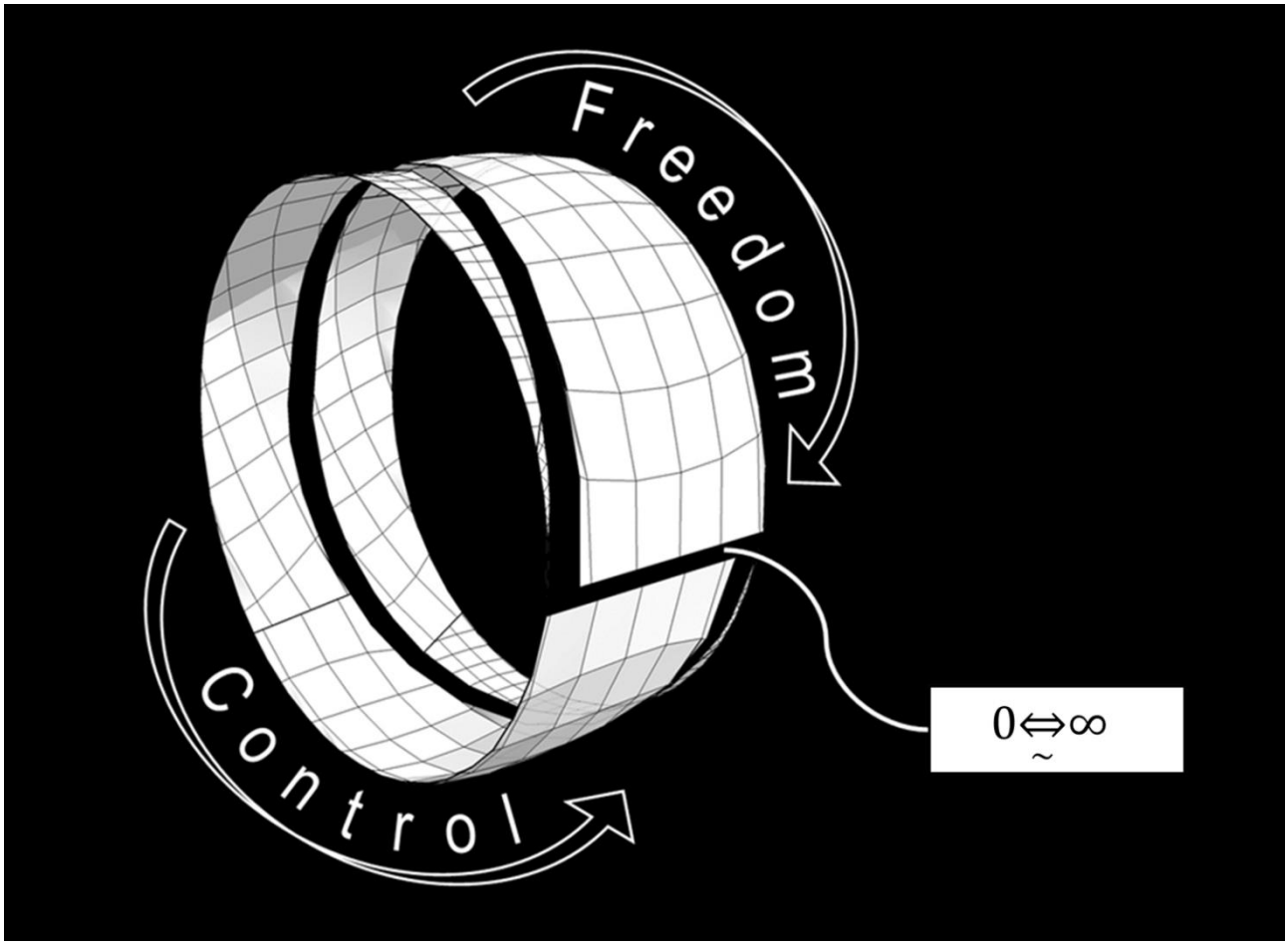
The Hegel Circle was developed as a research approach for this study, since investigation did not yield a suitable research approach for a soft paradigm management research study[73]. The Hegel Circle is an attempt at improved rigor as compared to the Soft Systems Methodology, Design Thinking, and the like, while providing improved adaptability over the Scientific Method. The Hegel Circle provided a framework that explained the systematic interplay of facts, values, and truths throughout the research process; and tests of truthfulness were prompted at each stage where conclusions were drawn. As may be expected from a first application of a novel approach, there were also challenges.

[73] This rather extraordinary claim is explained in more detail in chapter 1.3.

Ultimate rigor can only be achieved through falsification. However, as Popper noted, different theories provide for different levels of testability (Popper, 1963). The constraints wherein a research study must be completed have further impacts on the testability of propositions. The validation to which the propositions of this study was subjected may have produced a falsification if a threshold of rejection of the propositions were reached. However, the way in which the validation was executed, and the results garnered therefrom, sought, and obtained confirmation. Whereas the hypotheses cannot be rejected on these grounds, the hypotheses are not proven either.

The ultimate proof of the value of the propositions to the practice of IT project management will only be determinable after implementation in practice.

This of course does not mean that the research study was not successful. Rather, high expectations were set by the researcher. It certainly does mean that the authoring researcher could have been wiser. In hindsight it would have been better to follow an existing approach and to develop the Hegel Circle as a separate, next study. However, the Hegel Circle does present an alternative approach and has now been tested in a significant research study. The Hegel Circle already presents a contribution to the understanding and application of the interplay between different theories of truth, facts, and values. The Hegel Circle will be further developed as a research approach and may yet add significant value.



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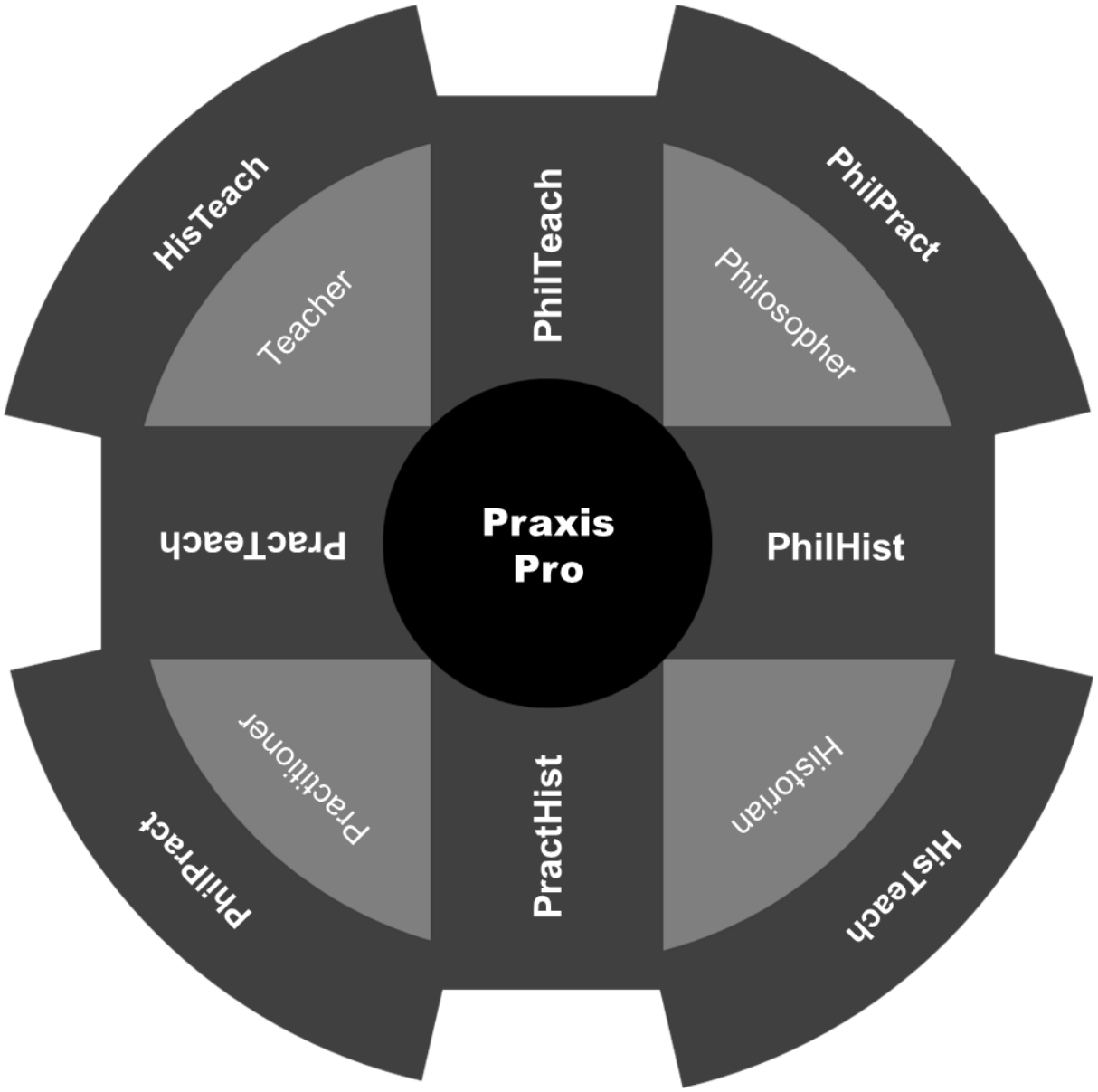


Appendix

"It's better to have it and not need it than
to need it and not have it."

George Ellis

Appendix A – The Generality of PM Principles

The first concern related to the generality of project management principles and practices. Are there general principles of project management that apply across industries and geographical regions? If not, it could not be expected that learnings from the setting would be of widely generalizable value. If affirmative, the positive opposite could not be rejected.

(Joslin and Müller, 2015) studied the relationship between the adoption of a project management methodology and approach and project success in different governance contexts, covering different industries spread over the entire world. According to this study 22.3% of the variation in project success could be attributed to the application of a project management methodology and approach. Analysis of the impact of project management approaches and methodologies on project success in different project environments again showed a positive correlation (Joslin and Müller, 2016b). These works risk conflating correlation and causation. (Joslin and Müller, 2016c) employed factor and regression analysis indicating project success correlating to 'stewardship approaches to stakeholder orientation' rather than control mechanisms. However, it stands that holistic organisational project management maturity correlates to project success across industries and geographical regions.

(de Carvalho, Patah and de Souza Bido, 2015) covered three South American countries, ten industries and more than a thousand projects, and found a positive relationship between project success and effort spent on developing project management capabilities. The factors relating to project success were more nuanced than cold method. Soft skills in risk management (De Carvalho and Rabechini Junior, 2015) and communication (de Carvalho, 2014) were cardinal, if less tangible, factors. (Berssaneti and Carvalho, 2015) also pointed out that while project management maturity significantly related to success in terms of time, cost, and quality, it did not relate to customer satisfaction.

(Zwikael and Ahn, 2011) focused on risk management in project management, covering three diverse countries (New Zealand, Israel and Japan) and 700 projects from multiple industries. They found significant context-related impacts on risk-perception, but still found that effort spent on risk management had similarly positive effects in all contexts.

(Bloom *et al.*, 2012) found significant differences in management practices across firms and countries. However, once the sample was filtered for organizations owned by dispersed shareholders and/or private equity, a stronger product market and the requirement of higher-skilled workers, then management practices again converged.

Two further studies displaying general factors across industries and countries are (Niazi *et al.*, 2016), as it pertains to PMBOK human resource knowledge areas relating to software development success; and (Martens and Carvalho, 2017) analysing project managers' perspectives on project management sustainability.

Principles and complexities identified as general and of importance in global studies have been confirmed for local IT project management too (Marnewick and Labuschagne, 2009; Hans and Mnkandla, 2019). There is an opportunity to extend this research by focusing specifically on IT project management in SA banking, where some of the identified general factors, like the implementation of formal approaches to IT project management, have been addressed and present cases ripe for research.

In conclusion, extant evidence strongly supports the generalizability of project management principles and practices across industries and countries. The caveats to be added are that correlation between project management methodology and approach and success is subject to holistic organisational project management maturity, and that a correlation-causation discrepancy exists in current project management research.

Appendix B – SA Banking for IT PM Research

The setting is IT projects in SA banking, and more specifically, Large, complex IT project in SA banking.

The large, complex banking project here refers to a project that contains disparate components, for example: software development and IT infrastructure and business process and compliance (regulatory) and training and marketing. It therefore requires multiple teams to deliver different types of work using different tools, exposed to ranges of risks and following unique processes to deliver an integrated outcome. Is it reasonable to manage the delivery of these unique portions using a single project management methodology and approach?

The researcher is an exceptionally well qualified[74] project management professional and boasts a decade's worth of experience as business consultant, project manager, lecturer, and coach in SA, Southern African, rest of Africa and offshore banking IT and Business Process Improvement. The observations are from practice; the study was conducted with practice in mind and practitioners involved; the propositions are for practice; and the examiner may judge the theoretical rigor.

It is important to ask whether the SA example of project management in banking IT projects is a special or a general case. Are the findings expected to be relevant in banking sectors outside of SA, and are the findings expected to be relevant to non-banking industries?

[74] Qualifications include Project Management Professional (PMI, active), Prince2 Practitioner (APMG, lapsed), and Agile Practitioner (APMG, indefinite).

B.1. SA Financial Sector and Banking Industry

SA has a highly sophisticated financial sector (Mishi, Sibanda and Tsegaye, 2016), among the most sophisticated in the world (Fanta and Makina, 2017), and a banking sector that is, overall, well developed, effectively regulated and backed by a sound legal system (Ifeacho and Ngalawa, 2014).

The financial system of SA compares well with financial systems of the developed world and have a well-developed banking and a competitive stock market with the Johannesburg Stock Exchange rated among the top 20 stock exchanges in the world (Nyasha and Odhiambo, 2014).

The SA banking industry is highly concentrated and operates in a monopolistically competitive market, where competitiveness has increased over time and continues to (Simatele, 2015). As example of increased competition, Capitec, founded in 2001, has provided significant competition to the original 'Big Four' banks (Mishi, Sibanda and Tsegaye, 2016) and has grown to become the second largest bank in the country, by number of clients, as of 2017. Capitec competed by successfully banking the unbanked, now forming part of the 'Big Five' banks along with the original major banks – Absa, FirstRand Bank, Nedbank, and Standard Bank. Technological developments have led to further competition, Discovery Bank and TymeBank having been launched as fully digital banks. TymeBank was one of the fastest growing digital banks in the world towards the end of the previous decade (Rover, Touareg and Cherokee, 2019).

SA's banking fees offer an interesting comparison to the rest of the world, the standout feature being pricing incentives for moving towards online-only banking and away from physical cash-handling and branch-dependence (BUSINESSTECH, 2018b, 2018a, 2019b, 2019a).

The SA banking industry makes for an interesting example for future research, in that it is highly developed and sophisticated, but situated in a developing country and continent, and facing technological, systems, and process challenges specific to developing countries in its drive to bank the un-banked (Fanta and Makina, 2017). Despite this challenge and others, SA banks have attracted interest from large international banks, the main examples being Barclays' acquisition of Absa in 2007 and the Industrial and Commercial Bank of China's acquisition of a 20% stake in Standard Bank (Ifeacho and Ngalawa, 2014). SA banks are resilient, as was proven by their survival of the 2008 financial crises and its aftermath, and its continued stability (Mishi, Sibanda and Tsegaye, 2016).

B.2. SA Financial Sector and Banking Regulation

SA banks are well regulated by the SA Reserve Bank (SARB) and the Financial Sector Conduct Authority (Ifeacho and Ngalawa, 2014) and the banks are conservatively compliant (de Koker and Symington, 2014). The SARB is independent, states its policies clearly and

has been successful in executing its policies, thereby adding to the stability of the SA economy (Rossouw and Padayachee, 2011; Zeederberg, 2018).

The protection of personal information act (POPIA) has been signed into law and banks had preemptively started complying with the expected regulation before the regulator had set the due date for compliance. POPIA compares well to similar acts from the rest of the world (Botha *et al.*, 2017) and is expected to satisfy the requirements of the European Union's general data protection regulation (GDPR) (Everlytic, 2018).

The implementation of Basel III is in progress. Where elements of the implementation lag, the relevant rules had not been published on time by authorities (Bcbs, 2020). SA banks being conservatively compliant, it is expected that progress will be swift upon the publication of the outstanding final rules.

B.3. SA Banking Channel Development

SA banking boasts good physical channel development, averaging 18 branches per 100 000 people, which is well above the global average of 12.6. Similarly, SA's 54 automatic teller machines per 100 000 people are well over the global average of 40.53 (Boesenach, 2018).

Fully fledged internet banking had been offered by the Big Four since 1997 (Ramahovna and Mokwena, 2016). According to Forrester Research's global benchmarking, Standard Banks's mobile banking application was among the top 20 in the world (Barry *et al.*, 2017). Judging by consumer reports, two of the other banks among the Big Five have similar or better mobile banking applications, while the rest do not lag far behind (Businesstech, 2018). Overall growth in the use of mobile banking applications have been very high for the last decade (P. Naidoo, 2018).

The IT-spend of the banking industry is, as a portion of operational expenditure, by far the highest in the SA example (Jhaveri, 2016).

First National Bank, part of the FirstRand Group, has been awarded the title of the most innovative bank in the world at the Financial Global Banking Innovation Awards (BusinessTech, 2012) and Capitec Bank has been rated as the world's best bank by the Lafferty Group's Global Bank Quality Benchmarking study on consecutive occasions (Capitec, 2019).

It can be concluded that channel development in SA banking compares favorably against the rest of the world. The ongoing transition from physical to virtual channels presents an opportunity for future research.

B.4. SA Banking Systems Landscape

B.4.1. Core Banking Systems

As far as the foundational systems landscape is concerned, for original Big Four, core banking started with IBM mainframe solutions (Jhaveri, 2016). Three different approaches have been prevalent in updating a core banking system (CBS). Standard Bank replaced its previous CBS with SAP's CBS during the 2010s. The shifting of the SAP CBS onto Microsoft's Azure cloud commenced in 2020. FirstRand underwent a significant upgrade to IBM's HOGAN in the 1990s, and ABSA and Nedbank have gradually updated the existing mainframe CBSs. Nedbank has referred to its approach to technology transformation as 'managed evolution'. Standard Bank's revolutionary approach caused its IT expenditure to dwarf that of the other original Big Four banks for more than a decade, with the expectation of significant development and maintenance cost savings in the medium to longer term (Jhaveri, 2016).

Furthermore, it seems as if CBSs, such as Oracle's Flexcube is being tested by some of SA's major banks in their rest of Africa operations, likely with intent of local implementation once proven and the implications for transformation being understood (Andreasyan, 2016; Visagie and Lok, 2017; Nedbank Group Ltd, 2018; Absa, 2019).

Capitec, having been founded in 2001, had the luxury of not being burdened by legacy systems and implemented Tata Consultancy Services Financial Solutions' BαNCS CBS before its initial launch (Stafford, 2015; Ntimane, 2020).

TymeBank, being even younger than Capitec, implemented MAMBU's SaaS CBS, which is entirely cloud based (TymeBank, 2019).

There is an opportunity for future research given the variety of CBS situations and the methodological requirements that will be put IT project management in this variety of contexts over the coming decade.

B.4.2. Payments, Clearance and Settlement Networks

BankServAfrica is Africa's largest payments clearing house and has a solid track record (Grunewald, 2019). It started with the establishment of the automated clearing bureau in 1972 and was arguably the world-leading payments system during the 1980s and early 90s (Price Water House Cooper, 2019). Concerted efforts, supported by the founding banks, the regulators and government, are being made to ensure that BankServAfrica will once again be the world leader in its field within the next decade (Grunewald, 2019; Price Water House Cooper, 2019; BankservAfrica, 2020).

The national payments system is regulated, supervised and overseen by the SARB (SARB, 2008, 2020) and the SA Multiple Option Settlement system (for large value interbank

transactions) was introduced the SARB in 1998 to bring interbank settlements in line with global best practice (BIS, 2012).

Payments systems have been integrated for the Southern African Development Community since 2013 (Wentworth, 2013).

B.5. SA PM Approach & Methodology Research

The aim of the literature survey is to describe the most notable streams of project management methodology research that have developed in SA. Multiple existing works contain similar rest-of-world surveys and references to such literature surveys, including the recent (Marinho *et al.*, 2019; Gemino, Horner Reich and Serrador, 2021), as well as the earlier work by (Wells, 2012). Focusing on the development of SA IT project management methodology research describe the local theory-foundation; and the local practice (since these studies mostly investigated local organizations); and identifies directions for future research and theory-practice gaps.

Notable literature was identified by lodging search-phrase requests in the International Journal of Project Management, the Project Management Journal, the International Journal of Managing Projects in Business, and the IEEE Transactions on Engineering Management. Scimagojr.com rankings were accepted as indicators of significance. Given the velocity of change in the field, searches included only publications from 2010 onwards. The search phrase can be expressed as “project management” AND “methodology OR approach OR standard OR best practice” AND “information technology OR IT OR software” AND “South Africa”.

Impact trees (Figure B.5-1) were constructed for the papers selected after the search in order to identify significant preceding (as referenced) or following (as per scholar.google.com citations) works which were not published in the four aforementioned journals. The significance of selected works were qualitatively judged according to the ranking of the containing journal, the amount of citations, and the relevance to IT project management methodology in SA.

It emerged that the most notable research into the methodological aspects of IT project management in SA focused on project governance and success factors. Works relating to these two topics are tabled in the first two subsections. In the subsection thereafter further notable project management methodology research not falling squarely within either of the first two camps are tabled. Research relating specifically to project practitioners is tabled in the last subsection.

B.5.1. Project Governance Research

Research relating to project governance, listed in table Table B.5-1, laid a foundation for projects in general, and outputs focusing on IT project management soon developed. Along with useful findings, clear directives for future research were provided in these works and

were acted upon. The result is an ordered development of project and IT project governance research still continuing, and which can be expected to develop further.

Table B.5-1: Works on Project Governance

Study	Focus	Findings/Contribution	Directions
Study	(Bekker and Steyn, 2008)		
Focus	The impact of governance on project performance		
Findings	"The application or non-application of project governance principles could have [an] influence on project outcomes."		
Directions	"The need for a formal definition of project governance."		
Comment	The direction was acted upon by proposing a definition and framework (Steyn and Bekker, 2009), and a definition specific for large capital projects (Bekker and Steyn, 2009).		
Study	(Marnewick and Les Labuschagne, 2011)		
Focus	Review of IT project governance in SA.		
Findings, results, outcomes, products.	"The majority of the organizations do have corporate governance in place but that they do not comply with IT and IT project governance." The "adherence to governance is a myth. This is a suspicion that has been expected and is of substantial importance."		
Directions for future research	To establish the link between corporate, IT, and project governance is concerned. Open forum debate on project governance in order to break the negative stigma. To expand this enquiry to other countries and beyond exchange-listed firms.		
Comment	See Figure B.5-1 and the relating text regarding the impact of this paper.		
Study	(Bekker, 2014)		
Focus	Governance Schools of thought		
Findings, results, outcomes, products.	Three schools of thought are proposed: "the single-firm school, multi-firm school and large capital governance school."		

	The "definition of project governance is a function of stakeholder complexity and functional positioning in the organization."
Directions for future research	The incorporation of further "governance variables and related theories such as transaction theory, social networks and agency theory" and complexities arising from local characteristics impacting multi-country firms and projects.
Comment	The direction was acted upon by (Bekker, 2015)), delivering "an integrated approach for leaders towards the definition of project governance that considers the various country approaches" and "an inclusive, conceptual project governance framework with principles and elements to be converted in project and organizational specific project governance frameworks and guidelines."
Study	(Wyk and Marnewick, 2016)
Focus	Governance for agile projects
Findings, results, outcomes, products.	"The success rate of Agile projects were not determined by applying traditional project governance, but rather the governing of Agile processes and principles. It could also be established that the success rate of agile projects is dependent on the experience of the team, the support from their stakeholders and the level of agile knowledge the team members acquired."
Directions	The alignment of agile methods to IT project governance and business strategy. To further develop the identified success factors.
Comment	*None*
Study	(Müller *et al.*, 2018)
Focus	Cycles and events shaping VLS & HLS interaction.
Findings, results, outcomes.	"A theory about the cycles and events that shape the interaction between VLS and HLS is developed, which includes events such as nomination, identification, selection, execution and governance, as well as transitioning."
Directions	"More case studies and more observational studies are indicated to better understand the iterative nature of the events and how they unfold in reality."
Comment	The authors are researchers from Europe, Australia, North America, Africa and Asia.
Study	(Erasmus and Marnewick, 2020)
Focus	IT governance & IS portfolio management.

Findings, results, outcomes.	"The results provided a sub-framework recommending specific IT governance practices to be applied to IS portfolios. The recommendations are categorized as activities to be maintained, enhanced and/or implemented."
Directions for future research	"Further research to be conducted includes creating a grand framework to address the linkages between portfolio, programme and project management as it relates to IT governance on various strategic levels."
Comment	*None*

Further to the ordered development of IT project governance research, the global impact thereof is notable. The references attributed to Marnewick and Labuschagne's (Marnewick and Lessing Labuschagne, 2011) review IT governance are illustrated in Figure B.5-1. The ten most cited works [(Young *et al.*, 2012; Wilkin, Campbell and Moore, 2013; Bekker, 2014, 2015; Ika and Saint-Macary, 2014; Mangalaraj, Singh and Taneja, 2014; Too and Weaver, 2014; Javani and Rwelamila, 2016; Tonelli *et al.*, 2017; Derakhshan, Turner and Mancini, 2019)] citing the 2011 paper, excluding self-citations, were selected. These ten works were, all put together, cited more than a thousand times. It is particularly interesting to note the authors of the selected works are from, and focus on, both developed and developing countries.

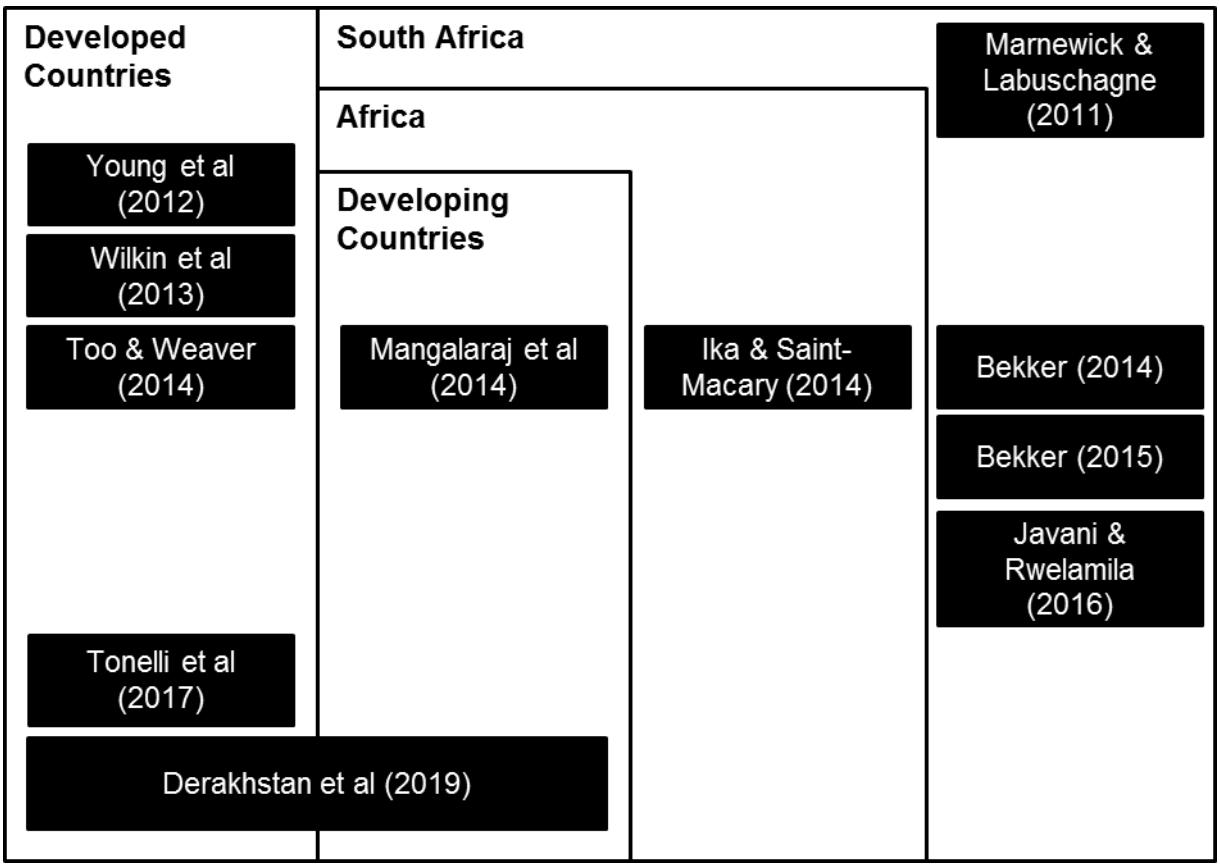


Figure B.5-1: Global Impact of a paper

It can be concluded that a solid foundation for IT project governance exists for the setting. Local research has global impact and clear directions for future research have been laid out.

B.5.2. Project Performance and Success Factors

Research relating to project performance and success factors followed a development path similar to that of project governance, and an overview is provided in Table B.5-2.

Table B.5-2: Works on Project Performance & Success Factors

Study	Focus	Findings	Directions
Study	(Mnkandla and Marnewick, 2011)		
Focus	PM education, knowledge, training, certification, qualification, curriculum.		
Findings, results, outcomes.	"Project management education in SA is uncoordinated, covers bits and pieces and is not comprehensive enough to equip project managers sufficiently with both theory and practice."		
Directions.	Improvement of PM training in SA and introduction of PM training and work-based experience at undergraduate level.		
Comment	Possible research: *X*% of universities offer PM as subject/module in IT-related undergraduate programs, *Y*% of universities offer undergraduate programs majoring in PM. Work-experience is common to all engineering programs, but only to *Z*% of other IT-related programs.		
Study	(Marnewick, 2012)		
Focus	Longitudinal analysis of ICT project success.		
Findings, results, outcomes.	Soft issues contribute to project success, rather than technical aspects. "Project success is not just determined by adherence to best practices or formal processes, but requires an environment and context conducive to business success."		
Directions	Analysis of ICT project maturity levels at the project level, for improved comparison.		
Comment	(Joseph and Marnewick, 2014) responds to this directive by presenting structured equation modeling for determining ICT project success factors.		
Study	(Dube and Marnewick, 2016)		
Focus	Performance criteria and a conceptual model of virtual project teams' success.		

Findings, outcomes, products.	"Leadership, trust, communication, team cooperation, reliability, motivation, comfort and social interaction" were identified and "were used to conceptualize the model" by which overall and individual success can be analyzed.
Directions	Aligning the performance criteria to the organizational vision and strategies.
Comment	*None*
Study	(Mkoba and Marnewick, 2016)
Focus	IT Project Auditing Assurance.
Findings, outcomes, products.	"A conceptual framework …for IT project auditing assurance throughout the project life cycle." Tailorable "high-level and detailed IT project assurance processes in each assurance review gate.
Directions	"Future research will focus on the integration of the framework with hybrid methodologies and agile approaches."
Comment	The envisioned future research was since undertaken and reported on (Mkoba and Marnewick, 2020b, 2020a) and further future research was to "focus on the integration of the conceptual framework with project hybrid methodologies and agile project management methodology" and "to compare the proposed work and justify performance and needs of work with recent studies and methods" was proposed.
Study	(Chiyangwa and Mnkandla, 2017)
Focus	Critical success factors for agile software development projects in SA."
Findings, results, outcomes.	"Organizational factors have a great influence on performance expectancy characteristics." "A comprehensive model that could provide guidelines to the agile community and to the agile professionals."
Directions	Testing the model in practice.
Comment	This paper, along with (Wyk and Marnewick, 2016), is part of an emerging theme relating to the formalization and firm-specific adaptation of agile.
Study	(Nkomo and Marnewick, 2021)
Focus	Framework for business process re-engineering (BPR) projects.
Findings, results,	"This study presents the recommended BPR framework that can be used by financial institutions to achieve success in" financial institutions' re-engineering projects." "This

outcomes, products.	framework overcomes most of the known challenges and combines two disciplines, that is, project management and business process re-engineering.”
Directions for future research	Executing roles and responsibilities definition for specific BPR projects. The testing of the framework in practice and further development thereof. Specific investigation into the change management aspects of BPR in the specific situation.
Comment	It is hard to believe that a BPR framework suggests change management aspects for future research, instead of heavily focusing thereon in the first place…

Similar to project governance research, it is concluded that a solid research foundation exists for project performance and success factors, and that valuable directions for future research exist.

B.5.3. Further Notable PM Methodology Research

In Table B.5-3 works deemed to be significant to IT project management methodology in SA, but not specifically belonging to the success factor or governance streams, are outlined.

Table B.5-3: Other Notable Project Management Methodology Works

Item	Description
Study	(Labuschagne, Marnewick and Jakovljevic, 2008)
Focus	PM Maturity SA IT
Findings, results, outcomes, products.	SA and international project success rates and challenges are similar. SA ITPM maturity improved since 2003, and continues to in terms of training and methodological standardization. Risk management remains a problem-area. With the focus shifting to organizational PM, it is concluded that the management of individual projects no longer pose a major challenge.
Directions	The investigation of the definition of project success changing from the triple constraint to the achievement of business objectives.
Comment	(Barry and Uys, 2011) adds to the picture of PM maturity in SA. The conclusion of individual projects no longer posing a major challenge is a risky generalization.
Study	(Nortier, Von Leipzig and Schutte, 2011)
Focus	Combining traditional & agile methods for software development.

Findings, products.	"A development process, which handles uncertain requirements and can adapt to software requirements that change late in the development cycle."
Directions	Testing of the framework in practice and further development.
Comment	This one among very few examples of local research into ITPMM hybridization.
Study	(Joseph, Erasmus and Marnewick, 2014)
Focus	Project versus product success.
Findings, results, outcomes, products.	"This research revealed that there is less focus on traditional project management success as more emphasis has been placed on project product success. Moreover, project outcome is more dependent on ''soft'' skills than on ''technical'' skills. Project management in SA seems to be in an idle state"
Directions for future research	"More work needs to be done to improve the current state of project management." Investigating the fundamentals of communication regarding project management to deliver "a viable and relevant communication model or framework for project management." Investigating the enhancement of PM leading as a cause of improved product success (since product success only indirectly indicates project success). The improvement of requirements definition and engineering for ICT projects.
Comment	On the issue of requirements engineering (Sebega and Mnkandla, 2017) proposed that "future research could possibly investigate the impact of certifications compared with in-house professional development programs." See the overview of (Joseph and Marnewick, 2018) in B.5.4. **Practitioner aspects**, which relates to this topic in part.
Study	(Marnewick, 2017)
Focus	Adherence to best practice.
Findings, results, outcomes.	Overwhelming non-adherence to, and lacking knowledge of, benefits management within the IS discipline. Practitioners mistakenly believe that they adhere to standards, but do not.
Directions	Repeating the research in other countries and for other disciplines. Improving both the composition and implementation of standards.
Comment	Within the increasingly agile and product-focused environment, a move towards the investigation of traditional methodological aspects starts.

Study	(Einhorn, Marnewick and Meredith, 2019)
Focus	Importance of living business case throughout project.
Findings, results, outcomes, products.	"Business case usage diminishes significantly after approval is given to proceed, with potentially serious negative consequences." Initial "building blocks for project business case theory" and insights to management of the business case through to the realization of the project's strategic benefits.
Directions for future research.	Elaborating on business case theory for projects and "beyond projects for initiatives such as strategy implementation, innovation or organizational transformation…" Determining the organizational factors impacting the effective use of business case. Repeating this research in other geographical areas.
Comment	(Einhorn, Meredith and Marnewick, 2020) follows up on the research direction and produce the "findings for the 43 organizational facilitators are that each one is considered more important than its presence in the respondents' organizations. High correlations emerge between the presence of the facilitators and the use of business case processes, indicating the pivotal role of the facilitators." This follow-up research was conducted on SA business IT projects. It added in-depth understanding of business case management in this setting. Organizational facilitators of the business case and business case processes are a contribution to business case theory. Similar surveys in other economies are proposed as future research. Further research using the same data-set was also proposed and could consist of investigations into the prevalent correlations, qualitative research to add to the interpretation of high-correlation factors, perspective differences between groups, and factor analyses.

Study	(Ntimane, 2020)
Focus	Disruptive innovation in banking (Capitec Bank).
Findings.	"The bank adopted the disruptive innovation road to introduce transparent and simplifying products and services on the backbone of technology."
Directions for future research	Investigating the effect of knowledge management during the disruptive innovation and developing disruptive innovation-specific knowledge management functions. Investigate whether disruption is "due to the technology life cycle or due to Porter's philosophy."
Comment	This work was a master's thesis and may be further developed by the researcher during doctoral studies. As it stands this investigation into disruptive innovation in SA banking offers a potentially valuable point of departure, but is not a complete work.

Study	(Khoza and Marnewick, 2020)
Focus	Agile & Waterfall Success rates in SA.
Findings.	"Agile projects are more successful than Waterfall projects to some extent, but there are still concerns to be addressed."
Directions for future research	"The results paint a mixed picture with regard to success rates. More in-depth analysis is required in this regard. The second contribution is that the SA results compare with those of other international studies. Although SA is a developing country, the results are comparable with those of developed countries." "IS project success is complex and is influenced by various aspects." Future research will include qualitative "analysis to gain a deeper understanding of this phenomenon."
Comment	The paper concludes with a remarkable line: "Which methodology or approach is best? The jury is still out on this."

A solid foundation and directions for future research is provided for IT and software development in general. IT project management in SA banking provides a specific case which is not adequately covered in existing literature, however, and provides a specific opportunity for research.

B.5.4. Practitioner aspects research

Significant research has been conducted into IT employee turnover. IT employee turnover, similar to the case in other countries (Lo, 2015), are high in SA. Employee turnover rates have been a cause of concern since the 1980s, and remains a challenge (Storm, 2015). Global trends with regards to the decreasing proportion of female IT employees is also prevalent in SA IT (Sibaya, 2016). This is the case despite relatively high remuneration packages being offered to gender and racially diverse IT professionals (R. Naidoo, 2018). It is not clear whether a significant non-female portion can be attributed to intra-IT employee turnover as described by (Lo, 2015).

The findings of the research into IT employee turnover in SA highlights the importance of job satisfaction and cognitive engagement (Storm, 2015), organizational culture and the role of the manager (Sibaya, 2016), organizational commitment and distributive & procedural justice (R. Naidoo, 2018), and work-life balance (Oosthuizen, Coetzee and Munro, 2019).

Notable works on people aspects in local project management approach and methodology research are listed in Table B.5-4.

Table B.5-4: Notable PM Research on people aspects

Item	Description

Study	(Marnewick, Erasmus and Joseph, 2016)
Focus	Analysis of IT project managers' performance and personal competencies.
Findings.	"It is apparent that IT project managers do not consider the Project Management Competency Development Framework important in its entirety, but instead choose to focus on certain competencies."
Directions for future research	"Future research is required urgently to determine why risk, communication and change control planning does not form part of a model to determine IT project manager competence." In-depth research into the 'Executing a project' unit of competence. Structural equation modeling to the components relevant to IT project managers.
Comment	*None*

Study	(Joseph and Marnewick, 2018)
Focus	Impact/ROI of PM certifications.
Findings, results, outcomes.	"SA IT project performance is not influenced by project management certification. Moreover, it was established that certifications need to be redesigned to ensure that the professionalization of project management remains on track."
Directions for future research	Redesign of content covered, and delivery, during the completion of certifications. Investigation of the decrease in certification, the better performance of practitioners without certification, the influence of certification on performance at different PM maturity levels, and different outcomes between different certifications.
Comment	This finding goes against maturity-factors previously held as self-evident.

Study	(Marnewick and Marnewick, 2020)
Focus	Demands of Industry 4.0 on project teams.
Findings, results, outcomes, products.	"Four categories of competencies are required of future project team members, in particular critical thinking and problem-solving skills. The composition of future project teams will also drastically change with the introduction of artificially intelligent robots as team members."
Directions for future research	Scientific validation of the conceptual propositions of the paper. Items for research are divided by three research areas. For the project team, items include technology-as-augmentation integration relating to actions and communication, and the influence of job-crafting on teams. Relating to project team members, research relating to

	training and education on future competencies are proposed. In the area of PM research is proposed on decisiong makaing integration, future intra-team communication, and processes to facilitate change processes caused by bottom-up role definition.
Comment	*None.*

Similarly to the previous sections, IT project management in SA banking is proposed as a specific area for research. Furthermore, the impacts between people aspects and methodological aspects of project management present opportunities for future research.

The literature survey described the local theory-foundation and opportunities for future research.

The literature survey highlighted the development of the methodological aspects of IT project management in SA. The investigation now turns to turns to application of IT project management approaches and methodologies in SA banking. The aim is to determine if IT project management in SA banking offers a case for project management approaches and methodologies research which could be of universal value. The research questions are:

- Is the IT project management literature relatable to the specific case of IT project management in SA banking?
- Does IT project management in SA banking offer an example of the requisite sophistication to be a valuable example for research?

The first research question is answered by providing a high-level overview of IT project management in SA banking. The information used to this end was obtained by means of targeted interviews with IT project management practitioners in SA banking. Information relating to SA IT project management practitioners were obtained from LinkedIn. This overview answers part of the second research question by describing the variety in, and formality of, IT project management approach and methodology application in SA banking.

The balance of the second research question is answered in two further ways. Published information is amalgamating to describe the technological landscape and the channels through which SA banks offer products and services. Secondly, LinkedIn.com was used again to obtain practitioner information.

B.6. IT PM Approaches in in SA Banks

Having reviewed literature on IT project management approaches and methodologies in SA, a high-level investigation into the application of IT project management approaches and methodologies in SA banking now follows.

(Labuschagne, Marnewick and Jakovljevic, 2008) identified growing adoption of formal project management approaches and methodologies and training of project practitioners in SA IT, and expected this trend to continue.

Information technology project processes have developed uniquely across the major banks, all starting from a decentralized, product-line approach and developing into different forms. Standard Bank had centralized its technology project delivery capability and initially implemented a traditional, waterfall project management methodology. This was later replaced by a Prince2-based methodology, and recently by SAFe. Not only was agile implemented as a project delivery methodology, the entire organization had been transformed into one that follows lean, agile principles.

FirstRand Bank maintained a decentralized approach and followed a minimum-governance approach to information technology project management. No formal project management approach and methodology was followed. This is status is changing, with the roll-out of DevOps as an approach to IT project management having ensued.

Somewhere in the middle of these two extremes, Nedbank developed a project management approach and methodology over decades. External advice had been utilized, in the form of IBM consulting during the 2000s, however, the bank had mostly been responsible for its own methodology creation, largely based on the PMBOK. Currently Nedbank has a formalized, internally developed waterfall, agile and hybrid approach; and internally developed management software that is used alongside the likes of Enterprise Project Management and Jira.

Furthermore, all of the major SA banks have either implemented change – whether continuous improvement or radical change – to its IT project management approach over the last half a decade, or is planning to introduce significant change in the immediate future.

Absa increasingly incorporates agile project management approaches and methodologies, especially when special project organizations are created for high-risk initiatives.

Capitec has followed a less formal, mostly agile approach to IT project management since its inception. Current initiatives aim at formalizing its methodological approach to IT project management.

TymeBank, as predetermined by choosing a SaaS CBS, uses agile.

This variety of methodological approaches to IT project management and the willingness of banks to initiate improvement drives, within the context of the complex systems landscape and the need to deliver new technology and products at increased velocity, present opportunities for future IT project management approach and methodology research. Opportunities for future project management approach and methodology research is expanded on in section 2.7.3.

It is expected that learnings from the setting would not be of use in significantly less or more sophisticated settings. ‘Sophistication’, in the sense that it is used in this text, is a catch-all term. With regards to systems and technology, it refers to variety, the level of development and the complexity of the interconnectedness. Pertaining to project practitioners, sophistication is indicated by employees’ experience and qualifications. Regarding project

management approaches and methodologies, the implementation and variety of formal methodologies is an indicator.

The sophistication of IT project management in SA banking was assessed according to descriptions in literature, core banking systems and the interaction with the greater financial system, the development of the channels by which products and services are offered, the maturity of project practitioners, and application of project management approaches and methodologies in SA banking IT project management.

B.7. Conclusion: SA Banking: as Research Example

This section has shown how the SA banking sector is not only well developed, but also provides immense variety and sophistication in both its systems landscape and approach to the use of project management methodology.

It was then shown that management practices, and project management practices, seem to transcend countries and industries.

Specific to IT, it can be added that a large portion of the high turnover of talent is intra-IT (Lo 2013), and the IT-spend of the banking industry is, as a portion of operational expenditure, by far the highest in the SA example (Jhaveri 2016).

Furthermore, SA banking operates at the intersection of a highly developed local sector that also has a large footprint in the rest of Africa, which provides a unique perspective for the research, regarding software project management in developing countries, that Shaikh and Ahsan (2015) claim to be required.

It is argued, therefore, that IT project management in SA banking provides a microcosm of great development, sophistication and variety, which can and should be studied as a case from which the learnings promise to be general and valuable.

Appendix C – PM Approach Change Implementation Guide

C.1. Strategic Change Guide Requirements

The strategic requirement is stated as a guide to the implementation of improvements to project management approaches and methodologies, which would allow for improved implementation, change management, and take-up of implemented changes while project delivery throughout the portfolio continues. This guide will be aimed at SA banking IT project management where the implementation of changes to the project management methodology and approach is desired (Figure C.1-1).

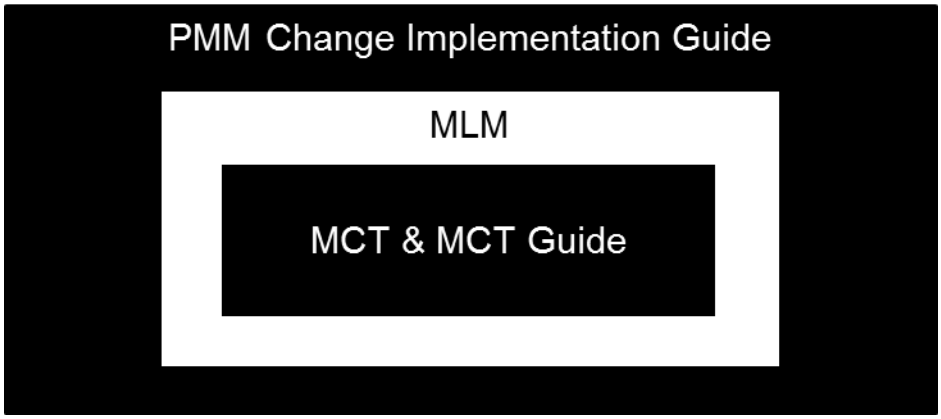


Figure C.1-1: Propositions in Context

The value of this guide lies in the specialization of change management for a specific, high-risk setting, an in its enablement of the previous propositions (sections 2.5.1 to 2.5.4).

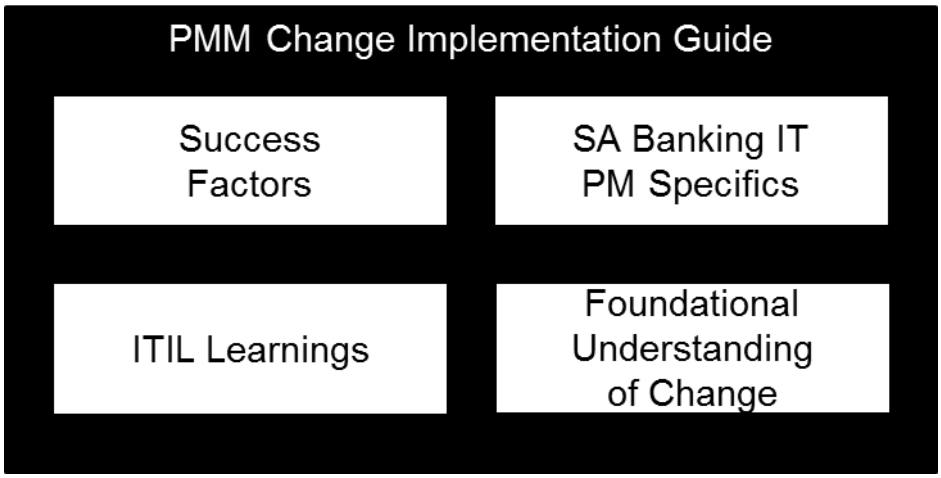


Figure C.1-2: The Components of the PMM Change Implementation Guide

The research objective relating to the project management methodology and approach Change Implementation Guide is to develop and validate the project management methodology and approach Change Implementation Guide.

The research question relating to the project management methodology and approach Change Implementation Guide is: How would a project management methodology and approach Change Implementation Guide successfully be developed and validated?

The project management methodology and approach Change Implementation Guide is required to (Figure C.1-2) and is summarized in Table C.1-1:

- Adopt and repurpose ITIL implementation success factors and lessons learnt for project management methodology and approach change implementation.
- To tailor ITIL content specifically to the specifics of SA banking IT project management.
- To identify and build on general theory of organisational change implementation and management.

Table C.1-1: PMM Change Implementation Guide Strategic Design Requirements

Strategic Design Req.	**Prob. Stmt.**
1 Adopt and repurpose ITIL implementation success factors and lessons learnt for PMM change implementation.	1.4
2 To tailor ITIL content specifically to the specifics of SA banking IT PM.	
3 To identify and build on general theory of organisational change implementation and management.	

C.2. Tactical Design Requirements for the PM Approach Change Implementation Guide

The strategic, high-level requirement has been stated as a guide to the implementation of improvements to project management approaches and methodologies, which would allow for improved change management and take-up of implemented changes.

The main tactical components that could deliver the strategic design requirement would include:

- A step-by-step guide for the implementation of changes to the project management methodology and approach that would allow for current delivery to continue while project management methodology and approach changes are effectively landed.
- A method that builds on ITIL principles and learnings and adapt these for the specific circumstances and needs of SA banking IT project management.
- A guide that generalizes learnings from reports on specific project management methodology and approach improvements.

Once improvements to the project management methodology and approach have been designed and developed, challenges remain to the successful implementation and take up of these enhancements. A guide to these implementations will be developed by adapting the lessons learned from ITIL implementations and its development and use of Critical Success Factors for the unique requirements of the project management landscape.

The tactical design requirements are summarized in Table C.2-1.

Table C.2-1: PMM Change Implementation Guide Tactical Design Requirements

Tactical Design Req.	**Strat Des Req.**
TDR1.1 – A step by step guide for the implementation of changes to the PMM that would allow for current delivery to continue while PMM changes are effectively landed.	1, 2, 3
TDR1.2 – A method that builds on ITIL principles and learnings and adapt these for the specific circumstances and needs of SA banking IT PM.	1, 2, 3
TDR1.3 – A guide that generalizes learnings from reports on specific PMM improvements.	1, 2, 3

Appendix D – The Development of PM Research

D.1. Challenges Faced in Management Research

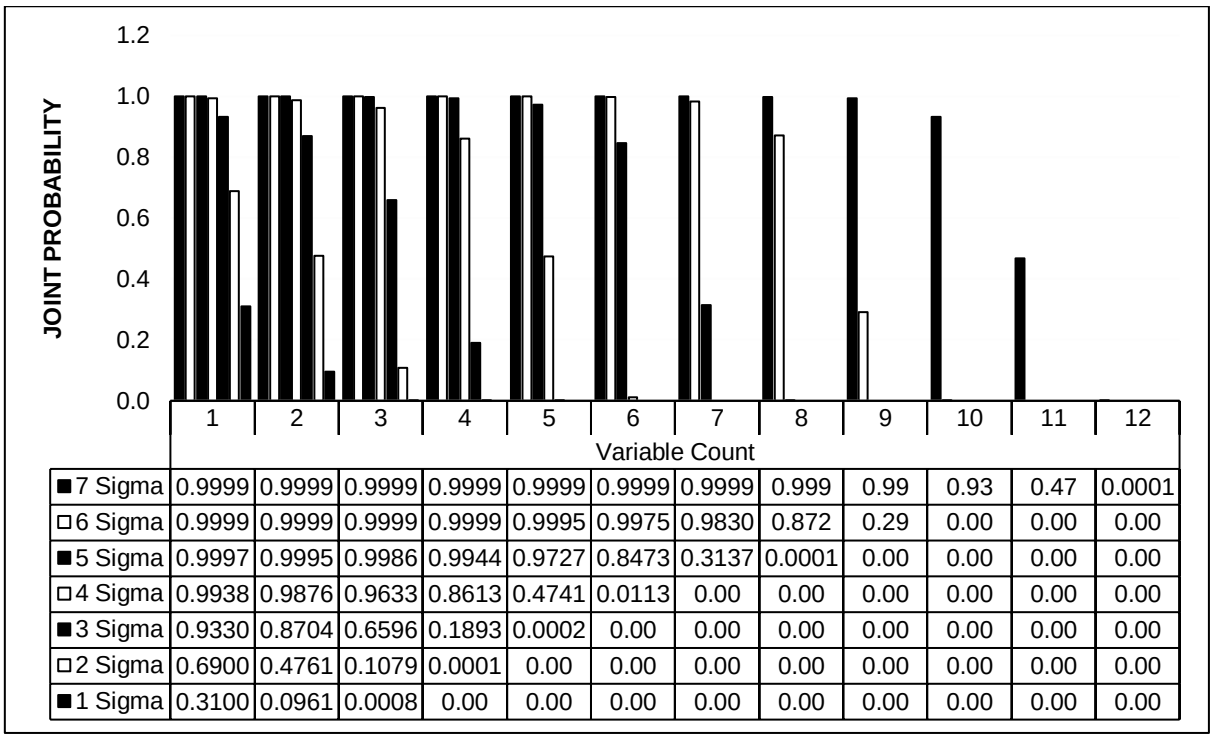
As is mirrored in project and project management research, the theory-practice gap has been an issue under investigation in management research and a distinction between the consolidation of practices and the application of theory in practice as research priorities has been proposed to be accepted as a matter of fact (Slack, Lewis and Bates, 2004). The 'academic gap' (Bell, Den Ouden and Ziggers, 2006) highlights the issues of non-comparable research output, fragmentation in the body of knowledge and studies developed around research questions that are largely irrelevant to actual managers.

In response to the objectivist-subjectivist dichotomy in management research (Böhme *et al.*, 2012) complex causal models (CCMs) in organizational research offer an improvement over reductionist deterministic research practices for the capability to model for multiple factors and interactions; and CCMs allow for the modelling of complex interactions with a type of rigor not realizable in qualitative research. However, an analysis (Saylors and Trafimow, 2020) of the Academy of Management Journal, Organizational Behavior and Human Decision Processes, and Administrative Science Quarterly from 2016 to 2018 found that six-variable CCMs were popular, which, at an optimistic individual probability of 0.8, would yield an insignificant joint probability – 0.035 in the case of an assumed 0.8 individual probability. The consequence is that a significant amount of publications in top management journals deal in falsities, which aligns with the low reproducibility achieved in management research (Bergh *et al.*, 2017).

Three responses are proposed:

- CCMs are to be more carefully specified in terms of variable selection – a probability of 0.8 could be a high probability for a single variable model, but exponentially worsens while degrees of freedom also decreases with the addition of variables. Adequate variables would therefore not only be selected for effect, but also as tradeoff between model-richness and accuracy, given the considered variables' predictability and standard deviation.
- Build gating into CCMs to allow models that:
- Take a quality-approach to variable management. In order to obtain a significant joint probability, the quality (and predictability) of the processes underlying a variable has to be better than 4 Sigma for each individual variable in order to yield a significant joint probability for a six-variable model (Figure D.1-1). Alternatively, a distinction needs to be made between the dynamic working of a multi-variable model and a gated-static approach where measurements and updates occur between causal variables; or thresholds and confidence factors are used.

These responses and their application in the Hegel Circle are explained in Chapter 1.3.



	1	2	3	4	5	6	7	8	9	10	11	12
■7 Sigma	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.999	0.99	0.93	0.47	0.0001
□6 Sigma	0.9999	0.9999	0.9999	0.9999	0.9995	0.9975	0.9830	0.872	0.29	0.00	0.00	0.00
■5 Sigma	0.9997	0.9995	0.9986	0.9944	0.9727	0.8473	0.3137	0.0001	0.00	0.00	0.00	0.00
□4 Sigma	0.9938	0.9876	0.9633	0.8613	0.4741	0.0113	0.00	0.00	0.00	0.00	0.00	0.00
■3 Sigma	0.9330	0.8704	0.6596	0.1893	0.0002	0.00	0.00	0.00	0.00	0.00	0.00	0.00
□2 Sigma	0.6900	0.4761	0.1079	0.0001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
■1 Sigma	0.3100	0.0961	0.0008	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Figure D.1-1: The Tragedy of Joint Probability in Complex Causal Models

As is illustrated in Figure D.1-1, in a normal joint probability chain, a probability equaling a *de facto* certainty is needed in order for a multiple-variable model to provide a meaningful output for soft science research, and an upper limit of eleven variables may be assumed for soft science research[75].

Theory elaboration (Fisher and Aguinis, 2017), inductive methods (Gioia, Corley and Hamilton, 2013; Eisenhardt, Graebner and Sonenshein, 2016) and action research have been proposed frequently in order to provide a theory-practice fit for qualitative methods (Gehman *et al.*, 2018), to make theoretical advances and also to bridge the theory-practice gap – replicable examples of the application of these ideas to the practice of management research has however been scarce (Eden and Ackermann, 2018). These approaches and issues are mirrored in project and project management research.

D.2. The Pragmatic Practice Turn in the Study of Projects and PM

Literature reviews in project management research are plentiful and have recently been analyzed as a body of literature to identify field-wide thematic trends (Padalkar and Gopinath, 2016b). Focused literature reviews (Stingl and Geraldi, 2017; Davies, Manning and Söderlund, 2018; Maylor *et al.*, 2018; Pollack, Helm and Adler, 2018) have been

[75] 'Soft science' here includes management research and project and project management research referring to the type for which, for both inputs and outputs, a probability <0.01 is insignificant and a probability >0.99 is a *de facto* certainty.

published since. Thematic trends and research directions, whether only described or also prescribed, have an impact on the development of research methodologies. Compared to (Checkland, 2016) theory-practice interplay (Figure D.2-1), in this case the practice of project management research generates the theory of project management research; and the theory of project management research impacts the practice of project management research.

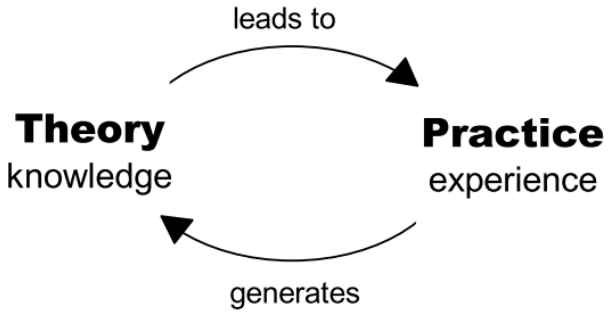


Figure D.2-1: Theory Practice Interplay (Checkland 1985)

(Padalkar and Gopinath, 2016b) offers a good analysis and reference guide to literature review in project management research. Useful to the understanding of project management research methodology reductionist determinism, explanatory empiricism, and non-determinism are identified as three approaches respectively developing from the sixties, mid-eighties and mid-noughties. Reductionist determinism and explanatory empiricism are dominant and calls for changes to research approaches are poorly answered.

Being a systematic review, the study is necessarily limited, which is accepted by the authors; and whereas the analysis-portion speaks for itself, the authors' resulting conclusions and propositions seem intuitive, but the derivation of the conclusions and development of the propositions are poorly described – the conclusions and propositions should be read with suspicion. The other works cited above for containing literature reviews, are subject-specific, and therefore not general. In order to build on existing works and to distill the general development of the project management research methodology-aspect from 2006 to 2020, a narrative overview is offered.

Prior to 2006, works introducing a Design Sciences Paradigm to both management research methodology (Van Aken, 2004, 2005; Peffers *et al.*, 2006) and to the systematic review of management literature (Tranfield, Denyer and Smart, 2003) were published. These works are not only widely cited within project management research, but were, like RPM, focused on research methodologies that would produce literature that is relevant to practice; and systematic literature reviews of project management research developed and was important leading up to 2006 and since.

(Crawford and Pollack, 2004) conducted a literature review and practice-based research to deliver a framework that aides the analysis and understanding of the hard (deterministic) and soft (non-deterministic) attributes of the characteristics of a project; and cites a growing importance of soft issues. (Crawford, Pollack and England, 2006), systematically analyzing

trends in the interest and influence of very traditional project management research categories, identifies a growing research interest in, and influence of, project evaluation and improvement. (Pollack, 2007) concluded that project management research was still dominated by hard research paradigms but that the influence of soft paradigms was growing.

Identifying issues similar to the theory-practice gap in management research, and endeavoring to produce “research that matters” (Blomquist, Hällgren, Nilsson and Jensen, 2010), the *Rethinking Project Management* (Winter and Smith, 2006; Winter *et al.*, 2006) movement veered away from deterministic and empirical paradigms and towards ‘softer’ paradigms. As an example, the investigation of projects *as they are practiced* (PaP) as a general approach to project and project management research have been developing steadily during the last decade. This development includes the application and practical development of project-as-practice; the theoretical development of project-as-practice drawing on Aristotelean insights to allow for practice-based research and pluralism while producing generalizable knowledge (Bredillet, 2013; Bredillet, Tywoniak and Dwivedula, 2015; van der Hoorn and Whitty, 2017); and theoretical development heavily influenced by Heideggerian ontology (Gauthier and Ika, 2012; van der Hoorn and Whitty, 2015b; Joslin and Müller, 2016a; Konstantinou and Müller, 2016). This can be described as an explicit ontological movement in project management research methodology.

Project Studies is growing as an approach to project and project management research and describes three types of research, *Type 3* research being described, drawing on Habermas’ *Communicative Rationality*, as necessarily critical of the status quo, but moving beyond deconstructing and problematizing and also seeking pragmatic, context-fit propositions (Geraldi and Söderlund, 2018b). It is also proposed that the theoretical foundation of project and project management research should be accepted as imperfect and that the *Schools of Project Management Research* and other foundational theories of project and project management research are to be used as working theories – beacons for the situation of novel research within the greater body, and as means of points of departure and introductions to the available ideas and methods in different areas of project and project management research (Biesenthal, 2016; Clegg *et al.*, 2018). This acceptance and utility theory and *Project Studies* can be described as a development of an explicit pragmatic-ontological movement in project and project management research. It should also be noted that what could be called an implicit empirical traditional approach remains and dominates project and project management research[76] (Biedenbach and Müller, 2011; Padalkar and Gopinath, 2016b; Pollack, Helm and Adler, 2018) (Crawford and Pollack, 2004) (Padalkar and Gopinath, 2016a).

The move towards pragmatism, which implicitly includes elements of anti-realism, can be referred to as a pragmatic practice turn in the approach to project and project management research – pragmatism and anti-realism accept the constraints under which a threshold of truthfulness must be reached to enable timeous, justifiable action. It can be argued that any

[76] ‘Pragmatic ontological-’ and ‘empirical traditional movement’ are used instead of ‘hard and soft’ paradigms and ‘deterministic, empirical, and non-deterministic’.

truth which is acted upon is, or becomes, or is used as pragmatic truth. The goal for project and project management research must therefore be to deliver the optimal pragmatic – usable and useful – truth[77] (Glanzberg, 2018) (Getzels and Kuhn, 2020) (Capps, 2019).

The philosophical underpinnings, and the stated goals of *Project Studies* and the pragmatic practice turn in project and project management research are sensible. There are, however, problems imbedded in action aimed at closing the theory-practice gap and in the creation of a theory of theories.

The justification for 'closing' the theory-practice gap assumes that so doing the relevance of project and project management research to practice would improve, but it would be more helpful to aim for the maintenance of a healthy, productive tension between theory and practice. To extrapolate from a commentary on the *No Silver Bullet* question (Galin, 2015), as theory and practice develop, there is also an increase in the complexity of the opportunities presented by the theory and the situation in practice. In a growing field, like project and project management research, it should rather be expected that the theory-practice gap will remain or enlarge for the foreseeable future. Be this as it may, it is evident that the approach taken in project and project management research is intertwined with the type of truth that is expected to be produced: The empirical-traditional approach may deliver output that would claim to be truthful for its correspondence to facts; the softer paradigms were geared towards producing output that would claim to be truthful for its coherence to values; and the ontological-pragmatic approach of project studies would justify its output for its usability and usefulness.

The Hegel Circle will seek to draw the strengths of these ideas of truth together and to highlight the risks of not being able to establish certain truth-types, so that such risk may be planned for.

[77] Follow this link and view this video for overviews of truth-theories, and follow this link for an overview of the Pragmatic Theory of Truth.

D.3. The Ordering of PM Research Towards a Coherent Body of Knowledge

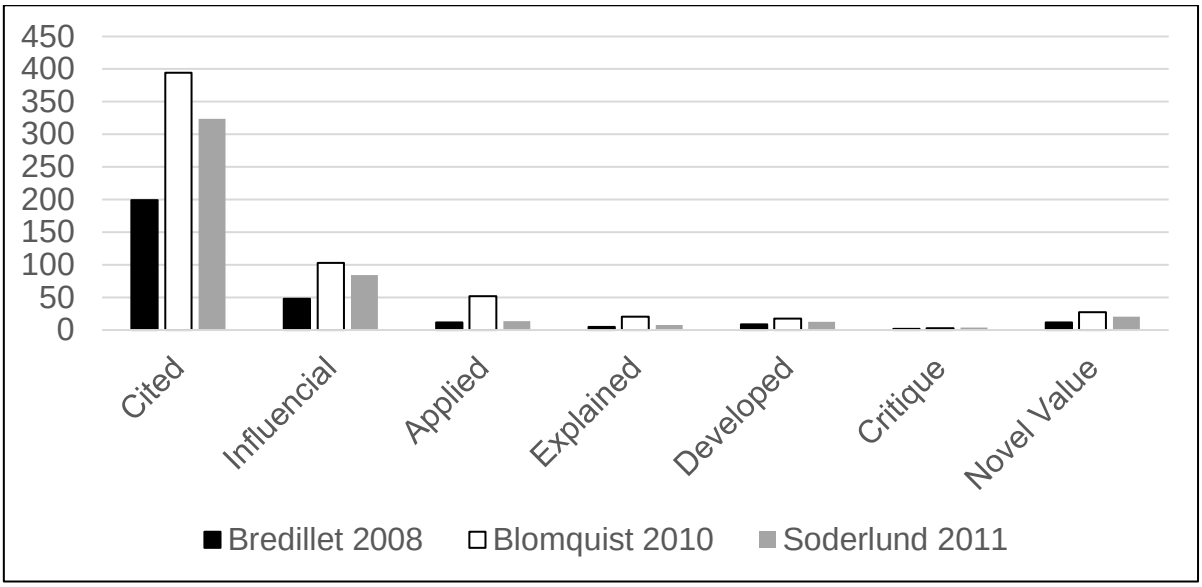


Figure D.3-1: Absorption of Seminal Works

Two previous approaches to enhance the practical application of the RPM ideas in the practice of project management research, was the proposition of the project-as-practice approach (Blomquist, Hällgren, Nilsson and Jensen, 2010) and the organization of project management research into 'schools of project management research' (Bredillet, 2008; Kwak and Anbari, 2009; Söderlund, 2011b; Turner, Anbari and Bredillet, 2013). The project-as-practice approach could be applied in the research of projects as they are practiced; and the 'schools of project management research' helps the researcher to identify common visions, tools and techniques of project management research enabling the productive utilization of the pluralism in the field and the accurate situation of novel research in the greater body of project management research. The absorption of three of the works that span 2008-2011 into project management research were analyzed.

It has to be asked: to what extent does project and project management research develop in an ordered fashion? Did writings on project-as-practice and schools of thought[78] become classics that directed and formalized future project and project management research?

[78] *Project Studies* is too young a field at this stage to ask this question for.

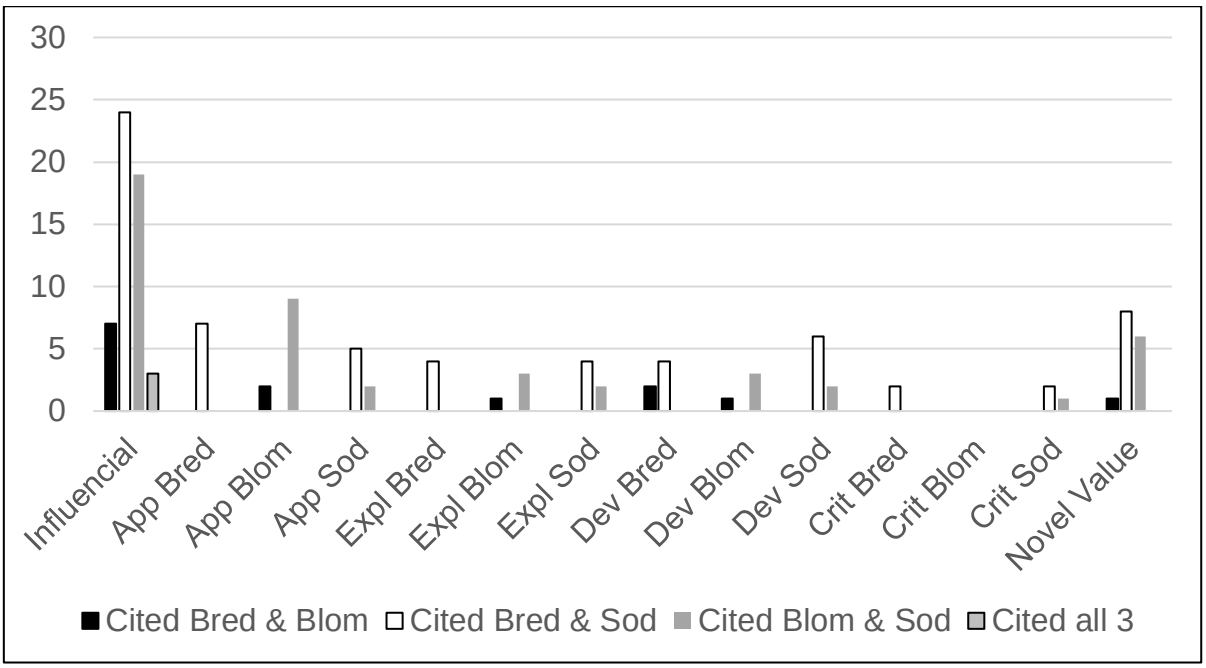


Figure D.3-2: Absorption of Multiple Seminal Works

Bredillet (Bredillet, 2008), Blomquist et al (Blomquist, Hällgren, Nilsson and Jensen, 2010), and Söderlund (Söderlund, 2011a), produced important papers on schools of thought and project-as-practice. As indicated in Figure D.3-1, these papers were widely cited, but few of the citing works were more than one of the papers. Works critical of project-as-practice or schools of thought and citing more than one of the papers are insignificant. Not a single work adding novel value to project-as-practice or schools of thought cite all three papers.

Figure D.3-2 shows the works that cited any two of the three, or all three, important works. While a handful of influential works cite two out of the three papers, only three influential works cite all three. Even fewer works applying, explaining, or developing project-as-practice or schools of thought cite influential[79], and very few works applied, explained, developed, critiqued, or added any novel value to schools of thought or project-as-practice. There were very few works that cited two or more of these papers, as illustrated in Figure D.3-1.

It has to be assumed that researchers are either unaware of these works, or choose to not revisit them; and most of those who do cite these works do not seem to engage in the content at all, turning these papers into de facto “citation classics” (Flyvbjerg and Turner, 2018). The critical revisiting of past works have been admonished in project and project management research (Söderlund and Geraldi, 2012), and examples can be found (Pollack *et al.*, 2018), but are rare.

[79] A work was judged as influential if it had more than ten citations; or if it was cited by a well-cited work; or, in the case of being published since 2018, if the work was published in a Q1 journal (as judged by Scimago), or authored by a well-cited researcher, or if it was believed for any reason that the work could become influential. Even at a low bar, most citing works are insignificant and made no contribution to schools of thought or project-as-practice.

These results are disappointing, since project-as-practice and schools of thought could be applied to anchor novel research in the body of project management knowledge as has been proposed (Biesenthal, 2016). For this reason, the Hegel Circle will provide a means of utilizing existing beacons in project and project management research for the situation of novel research. More importantly, very few works engage critically with a topic like schools of thought and only one deepens the 'Governance School' (Biesenthal and Wilden, 2014), one proposes for sustainability to be added as a school of thought (Silvius, 2017), and two papers (Bresnen, 2016; Lenfle, 2016) provide a criticism that could really lead to a positive development by stating that what has been put forward as schools of thought in project and project management research are rather fields of interest.

This results in schools of thought and project-as-practice papers becoming citation classics instead of leading to the development of the topics and the field. In order to combat this the Hegel Circle prompts the researcher, as has been proposed for project and project management research (Biesenthal, 2016), to use and compare the available ideas in the field or to criticize and develop these ideas if required.