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1.1 Company Profile

The Value Chain Hackers (VCH) Lab is an applied research environment operating within Windesheim University of Applied Sciences. Its core mission is to improve supply chain transparency, circularity, and resilience by conducting real-world case studies in collaboration with external companies. VCH follows a two-sided approach. On one side, students and researchers work as consultants to help companies identify and resolve inefficiencies or sustainability gaps in their value chains. On the other side, the lab generates independent, reproducible research that can be used to publicly expose companies falling short on transparency, circularity, or legal compliance. This unique structure allows VCH to operate both as an innovation partner and as a watchdog for systemic supply chain improvement.

The lab supports its projects with an ethical framework that includes alignment with EU legislation, such as the Corporate Sustainability Reporting Directive (CSRD), Extended Producer Responsibility (EPR), and the European Green Deal. VCH integrates standards like ISO 27001 for information security, and often benchmarks its work against emerging digital reporting frameworks. While its long-term goal is to establish Windesheim as a leader in research-based supply chain reform, the current operational challenge lies in the lack of a unified, repeatable methodology that students and staff can use to consistently deliver impactful results. At present, most projects begin from scratch, use different methods, and often do not continue after the final presentation. This weakens VCH's capacity to implement structural change or scale its impact beyond the pilot phase.

Because of this, the lab is currently transitioning toward building systems that allow for structured, transparent research flow. Your graduation project sits at the core of this transition. By designing a repeatable methodology and potentially prototyping a system to log, validate, and apply research outputs across multiple projects, your work has the potential to strengthen both the internal research culture of the lab and its external influence on companies and policymakers. The findings will be stored and tracked via a shared GitBut repository, which functions as a digital log of research progress and version control. All validation, communication, and check-ins will take place with Chris, who leads the lab at

Windesheim, while I will meet with my BI lecturers to ensure compliance with Inholland's assessment criteria. This structure ensures the project stays aligned with both academic and applied expectations.

1.2 Problem Statement

The core issue at the Value Chain Hackers (VCH) Lab is the absence of a standardized, repeatable methodology that enables students and researchers to consistently conduct transparent, actionable supply chain research. At the micro level, this means students face confusion, inefficiency, and trial-and-error approaches when starting new projects. Without a consistent framework to follow, most begin from scratch and rely on improvised tools or prior intuition, rather than building on tested processes or templates. This leads to wasted time, inconsistent quality, and research outcomes that are difficult to reproduce or validate.

At the meso level, the lack of shared structure makes it hard for internal VCH teams to coordinate, assess, or scale their research efforts across cases. Since each student uses a different method, VCH staff cannot compare outcomes, aggregate data, or build cumulative knowledge across projects. This weakens the operational core of the lab, forcing Chris and other supervisors to constantly re-align processes, provide one-on-one guidance, and manually intervene to ensure basic consistency across project outcomes.

At the macro level, the lab's credibility and long-term impact are at risk. Without reproducibility or a unified system for verifying the quality and comparability of student work, VCH struggles to position itself as a scientific actor within the applied research ecosystem. This undermines its ability to build trust with partner companies, secure long-term collaborations, or qualify for funding tied to research transparency or circular supply chain development. Grant eligibility, policy influence, and academic recognition all depend on having a structured, repeatable method that other institutions and evaluators can understand and audit.

The root cause of this multi-level problem is not lack of effort or ambition, but the absence of a coherent research model. Currently, no common structure exists to guide students or staff through the phases of problem framing, data validation, benchmarking, and result handover. Without this, projects become siloed, one-time efforts that do not produce lasting value for the lab or its partners. This

issue must now be solved if VCH is to grow into a sustainable, scalable research platform.

1.3 The Goal and Objective

The goal of this project is to create a research methodology that can be tested, validated, and ideally reused within the VCH Lab across future student-led cases. This will involve designing a clear, modular framework that guides users through each phase of the supply chain research process; from problem definition and stakeholder mapping to benchmarking, documentation, and implementation planning. By building this model in collaboration with VCH stakeholders, and validating it through simulation or a real case study, the system will be grounded in both practical and academic requirements.

The core objective is to deliver a complete method flow that solves the recurring problem of inconsistency and non-repeatability. This method will be documented in a way that allows other students to apply it directly, and optionally, it may be developed into a simple prototype or logging system hosted via GitBut. The project will conclude with a final report and presentation that explains the full research logic, testing outcomes, and proposed steps for integration into the VCH workflow.

The ambition is not only to create a one-time solution, but to deliver a tool that can support structural change at the lab. This requires designing the framework to be adaptable, updatable, and compatible with the broader ambitions of the lab such as EU compliance, grant-based research, and stakeholder impact. The goal is therefore both functional and strategic: to fix an operational bottleneck while helping VCH build the long-term credibility and capacity it currently lacks.

1.4 Match to Micro Innovation Track and Personal Fit

This project is an ideal fit for the Micro Innovation track because it targets a clearly defined, practical bottleneck within an existing organizational setting. It does not aim to overhaul the entire VCH Lab infrastructure or invent a new technology. Instead, the goal is to create a focused, small-scale research framework that solves a recurring problem and can be directly tested within the current system. The innovation lies not in introducing a novel idea from outside the lab, but in structurally improving what already exists by introducing repeatability, clarity, and documentation into the research process.

The solution is inherently testable and scalable. Once developed and validated through real input from students, supervisors, and internal documentation, the methodology can be applied to future student projects without additional structural changes to the lab. This means that the outcome of the project will be both limited in scope and high in utility, meeting the precise definition of a micro innovation. It solves one meaningful problem in one domain of activity, but in doing so, it opens the door to long-term improvements in efficiency, visibility, and credibility. The proposed framework has the potential to be adapted to other research areas or even used to support external collaborations, but it begins as a tightly focused tool for internal impact.

The assignment also matches my academic and personal background. As a Business Innovation student, I have developed and tested engagement frameworks in real-world settings, including during my placement at CoTiT. There, I learned how to coordinate across teams, build feedback systems, and deliver usable tools for lasting improvement. My role at the VCH Lab builds directly on that experience, allowing me to focus on system design, stakeholder validation, and repeatable research logic. This project gives me the opportunity to contribute to Windesheim's research capabilities while sharpening my own skills in structured innovation and applied implementation.

1.5 Confirmed Client Requirements

In close consultation with Chris, the lead coordinator of the VCH Lab, the essential client requirements for this project have been confirmed. The deliverables must address the recurring problem of research inconsistency and produce a usable outcome that VCH can apply in its ongoing student research efforts. The system must be simple enough for student use, but structured enough to support credible, reproducible outcomes that meet the expectations of academic and external partners.

Chris confirmed that the deliverables will include a stakeholder overview, a benchmarking study of comparable labs or frameworks, the design of a new research flow, and a final report with the option of a lightweight prototype or simulation. It was also confirmed that the timeline will span approximately six months for core development, with two to three months of built-in buffer to allow for stakeholder feedback, iteration, and alignment with future student cycles. GitBut will be used as the shared repository for logging documentation and

method testing, but it will not serve as the decision-making tool. Internal communication, progress check-ins, and feedback will be managed directly with the VCH team.

Additionally, Chris stated that the framework must be developed using accessible tools and documented in a way that can be reused by other Windesheim teams in the future. This makes clarity, structure, and ease of implementation non-negotiable design criteria. All requirements have been validated in writing and verbally, and additional alignment will be maintained throughout the project via biweekly check-ins and milestone reviews.

1.6 Clear Ambition Statement

This graduation project represents a pivotal step in my development as a future systems-based consultant. It pushes me beyond academic planning into applied transformation, where I am required to balance operational constraints, academic methodology, and innovation logic simultaneously. My core ambition is to create frameworks that make complex systems, such as sustainable supply chains, transparent and repeatable. This project enables me to gain hands-on experience designing reproducible systems, working within stakeholder boundaries, and converting strategic goals into testable outcomes.

On a personal level, this project challenges my tendency to overstructure ideas without leaving room for iteration. It pushes me to work closely with stakeholders within Windesheim, learning to adapt the system to real-world constraints rather than idealized concepts. I expect to grow in pragmatic decision-making, strategic thinking, and creative leadership under pressure. By delivering a solution that supports both Windesheim and its external partners, I am taking a meaningful step toward the professional consultancy role I aim to pursue after graduation.

1.7 BI Meta-Skills Mapping

This project requires me to integrate all five BI meta-skills in a deeply interdependent way. I began with Define by identifying the core breakdown in VCH’s research process, specifically the absence of a repeatable system. Drawing on stakeholder feedback from Chris and reviewing past projects, I clarified the root problem at the micro level of student execution, the meso level of internal scaling, and the macro level of external credibility.

The Design phase centers on building a structured, repeatable research framework. This involves selecting appropriate benchmarks, modeling the system architecture, and embedding validation flows, all while ensuring that the format remains usable by future students. In Execution, I am responsible for implementing each phase according to a clear timeline and milestone structure. Deliverables will be shared via GitBut and validated during biweekly check-ins, with the system tested using internal case applications.

In Learn, the framework will be refined through feedback from stakeholders and comparison with previous student outputs, ensuring that it evolves from a theoretical model into a grounded and functional tool. Finally, through Lead, I oversee all project communication, stakeholder coordination, progress tracking, and strategic decisions. This includes presenting complex ideas clearly to both academic and practical stakeholders and adjusting scope when risks emerge. By applying these five meta-skills in a unified and evolving way, I am able to bridge theory and practice while stepping into a leadership role that reflects my long-term professional goals.

1.8 Trends and Developments

This project aligns with three major developments that directly impact the relevance, urgency, and future adaptability of the system I am designing. These include the academic demand for reproducible research, the emergence of AI-supported research infrastructure, and the tightening of European supply chain transparency laws. Each of these trends reinforces the long-term strategic value of the framework being built at the VCH Lab.

First, the crisis of reproducibility in scientific research has gained global attention in the past decade. Major institutions now recognize that inconsistent, unrepeatable research processes erode public trust and make evidence-based policymaking unreliable (Nosek et al., 2015). In response, funders and universities are requiring research outputs to meet stricter reproducibility criteria, including method logging, documentation of decisions, and validation cycles. For VCH, aligning its student research with these reproducibility standards will not only improve internal quality control but also strengthen Windesheim’s research credibility in the national applied research landscape.

Second, tools for AI-enabled research validation are becoming more widespread. Emerging platforms such as Meta-Science Toolboxes and IBM’s FactSheets are

being used to semi-automate the auditing of research methods and data integrity (National Academies of Sciences, Engineering, and Medicine [NASEM], 2021). While AI is not the focus of this project, designing the research system with structured data logic, version control, and outcome consistency will make it compatible with these technologies. This foresight positions VCH to integrate AI support in future iterations of the framework, giving students more robust tools and enabling long-term digital transformation.

Finally, this project is directly tied to current European supply chain regulations. The Corporate Sustainability Due Diligence Directive, formally adopted by the European Parliament in 2024, mandates that companies operating in the EU must map their supply chains and assess human rights and environmental risks across their operations and partners (European Commission, 2023).. This creates immediate demand for transparent, auditable research systems that can support companies in meeting these legal expectations. A repeatable, student-led research infrastructure, if well designed, could offer a low-cost, high-integrity method for producing the supply chain visibility companies now need.

Together, these trends show that this project is not just a local academic task; it is a strategic response to three converging forces: reproducibility, AI validation, and legal transparency (Kumar & Reinartz, 2016; OECD, 2023). Embedding these insights into the research design gives the system long-term value, aligns with national and European expectations, and positions Windesheim's VCH Lab as a forward-thinking leader in applied sustainability research. This approach reflects a broader shift toward value-driven innovation, where practical, repeatable systems are prioritized to deliver lasting outcomes for both institutions and stakeholders (Bocken et al., 2014).

1.9 Why This Assignment Is Important

This assignment is critical to enabling the VCH Lab to achieve its mission of improving transparency, circularity, and sustainability in supply chains. The lab's research must be credible, usable, and repeatable. Without a clear methodology, past student projects have often been isolated, inconsistent, or unusable beyond a single case. This limits the lab's ability to grow or maintain strategic value. Fixing this issue protects the lab's role in producing research that meets internal needs and external expectations. With a validated methodology, future students

will be able to deliver outputs that companies can trust, grants can support, and Windesheim can present as credible academic work.

If completed successfully, the project gives VCH a reusable system for transparent and reproducible research. This supports compliance with EU laws (European Parliament, 2024), enables structured digital workflows, and allows consistent handover of research between student teams. It also strengthens Windesheim's reputation as a serious player in applied research and helps open access to external funding (NASEM, 2021; Nosek et al., 2015).

If the project is not completed, VCH will continue to produce disconnected outputs that are hard to compare or validate. As reproducibility becomes a standard for academic quality and grant eligibility, the lab risks falling behind. Windesheim's credibility and access to future partnerships or funding would weaken. This assignment directly addresses that risk and provides a clear opportunity for long-term improvement.

2.1 Main Research Question

The central research question of this Graduation Project is:

"How can a reproducible research infrastructure be designed, tested, and implemented within the Value Chain Hackers (VCH) Lab to improve the transparency, continuity, and practical impact of student-led supply chain research?"

This question directly reflects the structural breakdown validated by the client. As Chris confirmed, none of the student projects from the past year remained usable beyond final presentations. This undermines VCH's mission to drive real supply chain improvements through applied research. Without a transparent and repeatable methodology, outputs become fragmented, internal learning is lost, and external credibility suffers.

The question addresses the core challenge across three interconnected levels:

- **Micro level**: Students lack a shared system to structure, store, and communicate findings. This causes duplication, inefficiency, and confusion across projects.

- **Meso level**: Staff cannot coordinate or scale research across teams and semesters without a stable framework. Each new group starts over, limiting institutional memory.
- **Macro level**: The Lab's credibility weakens when results are not reproducible. This affects trust from companies, reduces eligibility for research funding, and disconnects VCH from EU transparency goals.

This question also incorporates validated needs from the client brief and Chris's direct input, including the requirement for a Quarto-based system, a research prototype, and a transferable documentation flow. It targets the exact innovation gap that blocks VCH from fulfilling its role as a driver of business transparency and circularity.

Framing the project around a reproducible system aligns with the Micro Innovation track. The research is scoped as a targeted improvement; internally testable, operationally embedded, and scalable in future phases. The question supports an iterative, stakeholder-validated design process that meets both academic and practical standards, allowing for flexible tool evaluation without assuming predetermined outcomes.

2.2 Sub-questions

To answer the main research question in totality and meet the required academic, operational, and innovation outcomes, the following five sub-questions have been designed. Each sub-question is grounded in the validated needs of the VCH Lab and supports the structural, testable, and scalable goals expected under the Micro Innovation track.

1. What structural and functional issues have made past VCH student research projects non-reproducible or operationally unusable?

This sub-question forms the problem diagnostic layer. It seeks to identify what specifically breaks down in VCH projects, whether that be documentation format, methodology inconsistency, lack of central logging, unclear stakeholder involvement, or absence of validation logic. By analyzing internal cases and conducting stakeholder interviews, this question will map the core patterns that lead to research waste or abandonment. This ensures that any proposed solution is directly built on validated internal weaknesses.

2. What frameworks or infrastructure models are used by other applied research labs to ensure reproducibility, transparency, and practical continuity across student-led research cycles?

This benchmarking sub-question allows external validation of the problem and identifies best practices. The focus will be on applied research environments similar to VCH; those working with SMEs, handling supply chain topics, or operating under EU or ESG-aligned mandates. The goal is not just to identify tools (e.g., Quarto, Git-based tracking, standard reporting templates) but to understand the logic behind those tools, the workflows they support, and the implementation strategies that made them successful.

3. What would a minimum viable reproducible research system look like for the VCH Lab, and how can it be designed to fit within existing student workflows, academic cycles, and stakeholder needs?

This sub-question bridges the gap between abstract models and practical usability. It frames the design phase of the project, where system components (templates, file architecture, workflow instructions, review checkpoints) are modeled to suit the constraints and needs of the VCH Lab. It also allows room to involve stakeholders (e.g., researchers, educators, company partners) to ensure the design is not only technically correct but also understandable and usable.

4. How can the proposed system be tested, validated, and iterated using a real or simulated VCH research case?

This question operationalizes the innovation. It ensures the solution will be tested in a realistic way, either by applying it to an active VCH project or by simulating a use case with historical data. The testing protocol will allow for stakeholder feedback, time tracking, documentation flow analysis, and identification of usability problems. This anchors the solution in lived experience, rather than just theoretical logic, and allows for early iteration before final delivery.

5. What conditions, formats, and implementation practices are required for this system to remain usable, updatable, and scalable for future research cycles at VCH?

This final sub-question ensures long-term viability. It focuses on handover conditions: where files are stored, who manages future updates, how the system

adapts to new types of research, and what governance (if any) should be in place to ensure the structure doesn't decay over time. It supports the ambition of embedding the system into VCH's future model and responds to the Excellent-level criteria that require near-future strategic planning and foresight logic.

2.3 Hypothesis

Based on the previously defined problem and supporting sub-questions, the central hypothesis of this project is that the Value Chain Hackers (VCH) Lab's inability to produce consistent, scalable research outcomes stems from the absence of a reproducible, transparent, and academically valid research methodology. This lack of systemization results in research that is difficult to replicate, hard to scale across student projects, and ineffective in building a credible foundation for long-term collaboration with external stakeholders.

This hypothesis emerges from the problem described in Section 2.1 and the diagnostic sub-questions in Section 2.2, which together identify a recurring breakdown in how student research is initiated, executed, documented, and transferred into real-world improvement. The issue is not just inconsistent output, but a systemic gap in how knowledge is generated and preserved across cycles. Without a shared methodology, results cannot be compared, insights cannot be extracted, and claims cannot be validated. This creates a risk of knowledge loss after each cohort and limits institutional learning and progress.

At the micro level, students work independently with improvised documentation and unclear expectations, making collaboration and feedback difficult. At the meso level, there is no shared infrastructure guiding teams or supervisors in aligning efforts, storing findings, or validating process quality. At the macro level, the lack of credible, repeatable research weakens the VCH Lab's influence in external policy or industry partnerships, especially in a landscape shaped by supply chain transparency, ESG standards, and data-driven reporting. Therefore, this Graduation Project proposes introducing a structured, reproducible research methodology. Through stakeholder interviews, benchmarking, and iterative testing, we will improve the repeatability, credibility, and impact of student-led projects. This methodology will include a step-by-step flow, feedback loops, version-controlled tracking via GitBut, and format specifications to ensure clarity, comparability, and continuity.

This hypothesis will be tested using a mixed-method approach. First, internal case analysis of past student projects will reveal how and where inconsistencies occurred. Second, benchmarking with external labs and frameworks will identify proven design patterns to adapt for VCH. Third, the proposed methodology will be piloted in a real or simulated use case to test usability, alignment, and repeatability. Throughout testing, stakeholder feedback from Chris and others at VCH will validate the outcomes. All progress will be logged in GitBut to ensure transparency and traceability. If validated, this hypothesis supports the project's immediate goal and lays the foundation for VCH to evolve into a reproducible research lab capable of enabling real improvements in company supply chains. This directly fulfills the ambitions outlined by Chris, meets the criteria for a Micro Innovation, and sets the stage for designing the methodology in Section 2.4.

2.4 Research Methodology

To test the central hypothesis and address the validated problem, this project will follow a structured, academically grounded research methodology. The approach combines qualitative case analysis, benchmarking, and iterative design to ensure the resulting framework is both theoretically sound and practically usable within the VCH Lab.

The research begins with an internal analysis of past student projects to identify recurring breakdowns in process, structure, and outcomes. Using tools like pattern recognition and root cause tracing, this phase will uncover where inefficiencies or knowledge loss occurred. Both successful and failed cases will be reviewed, with selection and access coordinated by Chris to ensure completeness and relevance. The second phase involves benchmarking external research institutions, particularly those working in applied or student-led research. This comparative analysis will use academic sources, reports, and interviews to extract common traits of scalable, reproducible methodologies. Focus will be given to institutions that combine educational research with real-world company involvement, aligning closely with the mission of the VCH Lab.The insights from the internal and external analyses will be merged into a draft framework. This will outline a repeatable structure with defined task phases, checkpoints, feedback loops, and documentation formats. The draft will be tested in a real or simulated VCH project, with iterative improvements made based on stakeholder input. All changes will be logged on GitBut to maintain transparency and version control.

Throughout, interviews with Chris and other stakeholders will serve as key validation points, from diagnosing the problem to testing and refining the framework. This follows a design-based research model, where iterative stakeholder involvement drives solution quality (Hevner et al., 2004). All materials will be stored in versioned GitBut folders and documented consistently for reuse. Interview data will follow Windesheim's data policies and ISO 27001 standards to ensure compliance with research ethics and information security (ISO, 2022). This validation logic aligns with open science standards. Transparent documentation, version control, and stakeholder feedback loops are essential to trustworthy research (Science Europe, 2022). Reproducibility is also critical for long-term knowledge transfer, especially in student-driven environments. The inclusion of GitBut, iterative feedback, and co-creation directly reflects these evidence-based practices.

This methodology ensures the project is rigorous, usable, and aligned with VCH's long-term goals. It supports traceability, encourages collaboration, and enables continuous improvement beyond the project's end. Risks such as limited stakeholder availability will be mitigated through early scheduling and fallback interviews. Workflow differences among students will be addressed with modular tools and onboarding. If no live project is available, a simulated case using anonymized data will be used to complete testing. These safeguards protect both the process and the final outcome.

3.1 Project Planning and Timeline

This project will follow a phased and carefully sequenced structure that ensures both academic depth and practical impact. It spans six months of active development, followed by a two-month buffer for stakeholder review, iteration, and unforeseen delays. The plan is built to remain flexible yet accountable, with all deliverables version-controlled on GitBut to ensure transparency and traceability. The goal is to deliver a fully tested, credible framework that is directly usable within the VCH Lab.

The first month is dedicated to stakeholder mapping and current state analysis. I will engage directly with Chris and other internal actors to clarify how student-led research is currently conducted, where breakdowns occur, and how knowledge is lost. I will analyze past student projects, internal documents, and informal system knowledge to identify workflow inconsistencies and gaps in transfer. These

insights will inform the project's refined research questions and boundary conditions.The second month marks the start of benchmarking while finalizing the research question and sub-questions. This phase includes reviewing reproducible research models from external labs, applied innovation environments, and academic literature. Special attention will be paid to institutions that combine student-driven research with real company involvement. Benchmarking findings will be translated into functional requirements for VCH, with clear notes on gaps and transferable best practices.

During months three and four, I will design and document the first draft of the new research framework. This structure will be grounded in both internal needs and external validation, offering a full process for framing problems, collecting and validating data, documenting outputs, and preparing final results. Step-by-step logic will be included, with built-in checkpoints, version control, and feedback loops. This prototype will be refined continuously based on input from Chris and other VCH stakeholders. In the fifth month, the framework will be tested in either a real or simulated use case. This pilot will evaluate usability, clarity, and replicability. I will track whether the system enables student researchers to independently conduct reproducible research that avoids the inconsistencies seen in past cases. Feedback will be collected from stakeholders during and after the test, and improvements will be implemented and logged in GitBut. The test will function as the final validation loop before packaging the final deliverable.

The sixth month will focus on completing the final report and preparing the handover package. This will include the full methodology, implementation roadmap, validation logic, and stakeholder feedback results. It will also propose a long-term adoption path for VCH, including future onboarding guidance, continuous improvement cycles, and system maintenance. The output will be archived in GitBut and designed for future student reuse. The additional two-month buffer ensures room for handling missed milestones, stakeholder delays, or final refinements before defense. This flexibility safeguards the project's quality while maintaining a strong pace. The overall planning logic emphasizes iterative design, embedded validation, stakeholder alignment, and sustainable implementation. In parallel with the milestone-based planning, I will regularly attend "The Office" on Tuesdays and Thursdays to meet with my BI supervisor. These informal check-ins will occur two to three times per month and support real-time feedback, alignment, and early troubleshooting. They

complement the formal sprint and milestone reviews with additional supervision continuity throughout the project. With this structure, the project will not only solve the validated problem but also deliver a framework that supports long-term research integrity at the VCH Lab.

3.2 Stakeholder Analysis and Role Division

The success of this project depends on a clear understanding of the roles and responsibilities of all stakeholders involved. At the Value Chain Hackers Lab, stakeholder input is foundational to every stage—from research design and benchmarking to framework testing and final implementation. Because the Lab operates as both a research platform and applied consultancy unit within Windesheim, stakeholder involvement must be continuous, relevant, and aligned with both academic expectations and operational priorities.

The primary stakeholder is Windesheim, represented by Chris, the coordinator of the VCH Lab and my direct client contact. Chris is responsible for validating project direction, granting access to internal data, supporting knowledge transfer, and evaluating milestone outputs. He plays a key role during stakeholder analysis, framework development, and final testing. Chris also approves scope changes and confirms whether the developed framework meets operational needs and is suitable for long-term integration into VCH workflows. As the student researcher, I am responsible for the end-to-end delivery of this Graduation Project. My role includes defining the research problem, conducting benchmarking, leading interviews, designing the methodology, testing the prototype, and documenting every phase through GitBut. I will manage the entire process timeline, engage in iterative alignment with Chris, and ensure that all phases are traceable, validated, and feasible within the context of VCH Lab operations.

I will meet regularly with my academic supervisors at Inholland University to ensure the project meets Graduation Project requirements and maintains methodological rigor. While they are not involved in daily operations, they play a key role in reviewing the research design, guiding structural decisions, and validating outcomes at critical milestones such as research question formulation, methodology, and final deliverables. In addition to these formal reviews, I will check in with my BI supervisor two to three times per month, usually by attending the Office on Tuesdays and Thursdays. These informal moments provide space

to clarify doubts, align decisions early, and maintain consistent academic oversight between milestones.

Additional internal stakeholders from VCH, such as former student researchers, internal supervisors, or staff familiar with reproducibility challenges, may also offer feedback during benchmarking and testing. Their input will help ensure the framework reflects actual use cases and supports future student usability. External references from other institutions working on reproducible research may be consulted to enrich framework development. All contributions will be recorded and versioned through GitBut to ensure the final output is well-documented, co-created, and academically grounded.

3.3 Required Resources

To deliver a usable and validated research framework for the VCH Lab, this project depends on several key resources. These include access to documentation, digital tools, internal stakeholder input, and reliable validation methods. Without these elements, the quality, feasibility, and long-term relevance of the framework would be compromised. The main platform for storing and managing research materials is GitBut. It will be used to track progress and archive all literature reviews, benchmarking findings, stakeholder insights, and framework drafts in a version-controlled format. This system ensures full transparency and consistency throughout the research process. Although Windesheim's Power BI license limits in-house reporting, the framework will be designed to remain compatible with Power BI or similar tools for future implementation.

Internal documentation will be provided through Chris, who has already confirmed access to past student projects, draft methods, and resilience scan reports. These materials will serve as a foundation for comparative analysis. Special attention will be given to projects that lacked transferability or failed to continue after delivery. Their limitations will be studied to identify key structural gaps and guide the development of a more effective, repeatable framework. In parallel, qualitative interviews will be conducted with current and former VCH students, mentors, and coordinators to better understand recurring issues, workflow patterns, and institutional needs. These conversations will take place between Weeks 2 and 5 and will be coordinated with Chris to ensure timely access.

Additional design tools such as Lucidchart for workflow visualization and Excel for template modeling will be used throughout the project. These tools support clarity and usability without requiring external funding or equipment. If advanced software becomes necessary at any stage such as during prototype testing or scenario modeling, its use will be discussed with Chris based on practical feasibility. All tools used will support traceability and will remain accessible to future students or researchers within the VCH Lab.

Validation will take place along two tracks. Operational elements such as the structure, templates, and documentation will be evaluated and approved by Chris to confirm alignment with Windesheim's internal goals. Meanwhile, the underlying research logic will be held to academic standards, ensuring methodological integrity and clarity of reasoning. Together, these resources, tools, and feedback loops will enable the creation of a credible, practical, and fully grounded research framework that responds directly to the needs of the VCH Lab.

3.4 Risks and Mitigation

Although the project scope is well-defined and validated with Windesheim and Chris, several risks may still affect the timeline, data access, or outcome relevance. To keep the process reliable, each risk has been anticipated and matched with a practical response.

One key risk is limited stakeholder availability. VCH operates within an academic setting where staff and mentors may be unavailable due to other responsibilities. If interviews or testing are delayed, a two to three-week buffer has been built into the timeline to absorb disruptions. When needed, insights from past project files shared by Chris will replace live input. Access to previous student research is also essential.

While Chris has confirmed archive access, delays or incomplete files could limit comparison. In such cases, external benchmarks and frameworks like Theory U will guide the early research design to maintain structure and rigor. Misalignment with Windesheim expectations presents another risk. If priorities shift or constraints emerge mid-project, progress could be impacted. To manage this, the project uses biweekly check-ins with Chris to realign on scope, pacing, and deliverables. Platform issues are also possible. If GitBut faces access or storage

limits, a secure backup folder on Windesheim's cloud will be used to keep documentation continuous and version-controlled.

Lastly, there's a risk of overcomplicating the framework. To avoid this, the design will follow a Minimum Viable Method approach, starting simple and adding only what proves valuable through validation. Together, these mitigation strategies ensure the project stays focused, adaptive, and grounded in both research quality and operational relevance.

3.5 Criteria and Specifications

To ensure all project outcomes are usable, repeatable, and relevant for the VCH Lab, each deliverable has been designed to serve a clear function in solving the identified research problem. Together, they form a structured research system that supports continuity, traceability, and long-term use within the Lab.

The project will begin with a Stakeholder Overview and Current State Analysis, mapping the key actors involved in student research and identifying breakdowns in knowledge transfer and methodological flow. This will be based on interviews, past documentation, and workflow analysis. The result must provide a clear picture of how roles, communication, and institutional gaps affect research reproducibility. Next, a Benchmarking Report will compare VCH's current research environment with three to five peer institutions that demonstrate strong practices in transparency, documentation, and cross-team continuity. The report will analyze relevant models, tools, and team structures, with findings supported by academic literature and public case data. It will be written as a formal document following APA standards.

Insights from both diagnostics will guide the development of a visual Research Framework, supported by a written explanation. This framework must be clear enough for first-time users to follow and flexible enough to adapt to different project types. It will include step-based logic, decision points, and definitions that support student independence and supervisory consistency. If feasible, a Prototype or Simulation will also be created. This may take the form of editable templates, structured workflows, or a pilot application of the method to a real or archived VCH case. Its goal is to test usability and show how the framework operates under real-world constraints.

All components will be integrated into a Final Strategic Report, which consolidates the research process, framework design, feedback, and implementation strategy. This report will be suitable for internal adoption and external presentation, supporting both Lab-level decisions and academic collaboration. Every file will be version-controlled through GitBut, with clear naming conventions and update logs tied to each milestone. The full set of deliverables will reflect not just academic expectations but the operational needs of a Lab aiming to increase transparency, reduce project waste, and create a lasting foundation for student-led research.

3.6 Milestones

To ensure this project remains realistic, actionable, and adaptable, the delivery timeline is structured into milestone-based phases. Each milestone spans one to two months and includes four focused sprints: (1) Define and scope, (2) Design and pilot, (3) Evaluate and refine, and (4) Finalise and deliver. This rhythm enables regular validation, continuous alignment, and flexibility to adjust without compromising the overall pace.

The full timeline includes six months of active development, with a built-in two-month buffer for feasibility testing, stakeholder alignment, and final polishing. This pacing allows for in-depth research while maintaining readiness for timely delivery. The following table outlines the proposed milestones, their corresponding sprints, and the intended outputs at each stage:

Months	Milestone	Sprint Focus	Planned Outputs
1–2	Stakeholder Mapping and Current State Diagnosis	Define problem → Design interviews → Evaluate feedback → Finalise map	Stakeholder Map, Bottleneck Analysis, Initial Stakeholder Feedback
2–3	External Benchmarking and Research Question Finalisation	Scope institutions → Map methods → Analyse best practices → Confirm sub-questions	Benchmark Report, Validated Research Questions, Framing of Hypothesis
3–4	Framework Design and Methodological Structure	Define draft → Pilot with examples → Refine via input → Lock core system	Initial Framework Blueprint, Flow Diagrams, Data Collection Templates

4–5	Internal Testing and Prototype Refinement	Deploy mini-pilot → Capture use case data → Evaluate results → Refine prototype	Simulated or Partial Test Case, Feedback Summary, Adjusted Framework
5–6	Strategic Reporting and Implementation Planning	Align final outputs → Format delivery → Collect final feedback → Submit draft	Final Strategic Report, Validation Summary, Transfer Package (Documentation + Handover Guide)
7–8	Iteration, Backup Plan, Final Polishing	Re-test if needed → Escalate any blockers → Apply final edits → Upload to GitBut	Final Adjustments, Updated GitBut Logs, Implementation-Ready Files

Each milestone will conclude with a check-in meeting with Chris (client) to validate progress, surface risks, and agree on any needed course corrections. All decisions, updates, and deviations will be transparently logged in GitBut and incorporated into the next phase. This milestone structure supports both rigorous research and practical delivery. It ensures time for reflection, allows for agile development, and enables a flexible yet focused path toward a tested and transferable outcome for the VCH Lab.

3.7 Success Criteria

The success of this Graduation Project depends on how effectively it addresses the core operational issue at the Value Chain Hackers Lab: the lack of a clear, repeatable, and transparent methodology for student-led research. Success will be measured across three dimensions—practical effectiveness, stakeholder validation, and strategic institutional impact—aligned with the criteria of reproducibility, usability, and continuity set out in the project brief.

Practically, the framework must enable students to conduct reproducible supply chain research with clarity and accuracy. Key features include structured workflows, version-controlled documentation templates, and defined quality checkpoints. These elements will be tested through a prototype and documented in a Quarto-based user guide, with clear improvements shown over current unstructured methods.

At the stakeholder level, success requires full validation from internal actors, including Chris as project owner and at least one supervising faculty member.

The framework will be piloted using realistic scenarios and refined through iterative feedback. Evidence of this process will be logged via GitBut and reflected in the Quarto guide. One independent student must also use the framework to successfully replicate a prior result, confirming functional reproducibility.

Strategically, the project will be successful if the framework is approved for continued use at VCH, integrated into future student assignments, and aligned with goals around traceability, transparency, ISO 27001 compliance, and EU data readiness. If formally adopted into the VCH process documentation, this will represent the highest level of success. Progress will be tracked through milestone reviews, documented iterations, and version-controlled outputs, with final confirmation based on stakeholder approval, student test case integration, and archival in the VCH knowledge system.

3.8 Location for Shared Data, Files, and Updates

All research data, working documents, and deliverables will be stored in a structured, version-controlled GitBut repository created specifically for this project. This shared workspace will serve as the central hub for tracking progress, ensuring transparency, and supporting future reuse within the VCH Lab.

The repository will include annotated literature reviews, benchmarking sources, trend analyses, and documented stakeholder input such as interview transcripts and alignment feedback. Drafts of the research framework, visual workflows, prototype iterations, and method designs will be versioned and updated continuously in this space. Final outputs—including the validated methodology, implementation plan, strategic report, and presentation materials—will also be stored here.

Project updates such as weekly reflections, milestone changes, and key decisions will be logged in a consistent format to ensure traceability. The GitBut environment allows rollback, version tracking, and live collaboration features that support structured feedback from both internal and external stakeholders.

Biweekly meetings with the client (Chris) will provide ongoing alignment on milestones and validate progress. These sessions will be supported by written summaries and verbal updates to ensure clarity across roles. This system not

only supports long-term reproducibility and onboarding, but also provides a replicable template for how future VCH Lab projects can be managed and documented in a research-sound manner.

Conclusion

This Graduation Project Plan sets out a clear and realistic pathway to address a core operational challenge at the Value Chain Hackers Lab: the absence of a reproducible, transparent research methodology that supports continuity, credibility, and real world implementation. By following a phased timeline supported by stakeholder feedback, benchmarking, and iterative validation, the project is designed to deliver both academic quality and applied value.

The plan aligns with the criteria of the Micro Innovation track by proposing a targeted improvement to an existing system within a real context. Each phase builds logically on the last, ensuring that insights are continuously applied, risks are actively mitigated, and deliverables are meaningful. With clearly defined roles, a validated research design, and success criteria linked directly to stakeholder and institutional goals, the project meets all required standards for a Graduation Project.

At a personal level, this assignment offers the opportunity to integrate and apply the full range of BI meta skills from problem definition to execution and leadership, while contributing a solution that may have long term benefits for future researchers. I am committed to carrying out this project with discipline, clarity, and close communication with both the VCH Lab and my academic supervisors. If executed as planned, this project will result in a tested and validated methodology that can be reused across research cycles, supporting the Lab’s ambition to create lasting impact through student-led innovation.

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