

2026 Abschlussarbeiten Travaux de fin d'études Graduation Theses

BSc in Wirtschaftsingenieurwesen

BSc en Ingénierie de gestion

BSc in Industrial Engineering and Management Science

- Technik und Informatik
- Technique et informatique
- Engineering and Computer Science

Inhalt

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Leiter Wirtschaftsingenieurwesen
Responsable du domaine Ingénierie de gestion
Head of Industrial Engineering and Management Science

Geschätzte Leserinnen und Leser

Wir erleben eine Zeit tiefgreifender Umbrüche: Digitalisierung, Künstliche Intelligenz (KI) und massive geopolitische Spannungen verändern Märkte, Geschäftsmodelle und globale Wertschöpfungs-systeme grundlegend. Effizienz allein genügt nicht mehr – gefragt sind Resilienz, Innovation und nachhaltige Lösungen.

Wirtschaftsingenieur*innen gestalten diese Transformation aktiv. Auf Basis der drei Säulen Technik, Informatik und Wirtschaft verbinden sie technologische Expertise mit wirtschaftlichem Denken und entwickeln datenbasiert robuste und verantwortungsvolle Lösungen. Im Kontext von KI übersetzen sie technologische Möglichkeiten in konkreten Mehrwert – für Unternehmen und Gesellschaft.

Das WING-Studium an der BFH bereitet gezielt darauf vor: interdisziplinär, praxis-nah und zukunftsorientiert. Unsere Absolvent*innen lernen, komplexe Systeme zu verstehen, fundierte Entscheidungen zu treffen und Veränderungen wirksam umzusetzen.

Gerade in einem dynamischen und unsicheren wirtschaftlichen Umfeld zeigt sich: Wirtschaftsingenieur*innen sind auf dem Arbeitsmarkt stark gefragt. Auch vor dem Hintergrund sich wandelnder Berufsbilder durch Digitalisierung und KI verfügen sie über die richtigen Kompetenzen, um neue Rollen aktiv und erfolgreich zu gestalten. Damit blicken wir mit Stolz und Zuversicht in die Zukunft unserer Absolvent*innen.

Viel Freude bei der Lektüre und inspirierende Grüße.

Chères lectrices, chers lecteurs,

Nous vivons une période de profonds bouleversements: la numérisation, l'intelligence artificielle (IA) et les tensions géopolitiques transforment radicalement les marchés, les modèles d'affaires et les systèmes de création de valeur. L'efficacité seule ne suffit plus: la résilience, l'innovation et les solutions durables sont désormais recherchées.

Les ingénieur-e-s de gestion forgent activement cette mutation. Se fondant sur trois piliers – technique, informatique et économie –, ils et elles allient expertise technologique et logique commerciale pour proposer des solutions fiables et responsables, basées sur les données. En intégrant l'IA, ils et elles transforment des possibilités technologiques en valeur ajoutée concrète, pour les entreprises comme pour la société.

Interdisciplinaires, concrètes et tournées vers l'avenir, les études en Ingénierie de gestion à la BFH offrent une préparation ciblée. Nos diplômé-e-s apprennent à décoder des systèmes complexes, à prendre des décisions fondées et à générer des changements.

Dans un contexte économique dynamique et incertain, les ingénieur-e-s de gestion sont très demandé-e-s. Face à l'évolution des profils professionnels induite par la numérisation et l'IA, ils et elles disposent des compétences adéquates pour assumer activement et avec succès de nouveaux rôles. C'est avec fierté et confiance que nous envisageons l'avenir de nos diplômé-e-s.

Bonne lecture et salutations inspirées.

Dear Readers

These are times of profound upheaval. Digitalisation, artificial intelligence (AI) and massive geopolitical tensions are fundamentally changing markets, business models and global value systems. Efficiency alone is no longer sufficient. What is needed are resilience, innovation and sustainable solutions.

Industrial engineers actively shape this transformation. Based on the three pillars of technology, IT and business, they combine technological expertise with business thinking and develop data-based, robust and responsible solutions. In the context of AI, they turn technological possibilities into concrete added value for companies and society.

BFH's bachelor's degree programme in Industrial Engineering and Management Science is specifically designed to prepare students for these challenges through an interdisciplinary, hands-on, and forward-thinking curriculum. We equip our students to navigate complex systems, make informed decisions and implement impactful changes.

Industrial engineers are in high demand on the job market, especially in a dynamic and uncertain economic environment. Despite the evolving nature of job profiles in the digital age and with the rise of AI, they have the right skills to shape new roles actively and successfully. We therefore look forward to the future of our graduates with pride and confidence.

We wish you a pleasant read.
Inspiring regards.

Wirtschaftsingenieurwesen an der BFH

L'ingénierie de gestion à la BFH

Industrial Engineering and Management Science at BFH

3

Die Berner Fachhochschule BFH steht für eine dynamische und zukunftsorientierte Ausbildung, in der praxisnahe Erfahrungen und innovative Lösungen im Mittelpunkt stehen. Im Departement Technik und Informatik werden Studierende des Wirtschaftsingenieurwesens nicht nur mit aktuellem Fachwissen ausgestattet, sondern auch dazu inspiriert, als Pionier*innen ihrer Branche voranzugehen. Dieser Studiengang bietet eine interdisziplinäre und internationale Lernerfahrung, die eng mit der Industrie verknüpft ist und somit einen direkten Weg in eine erfolgreiche Karriere ebnet.

Im Bachelor-Studiengang Wirtschaftsingenieurwesen werden die Studierenden optimal auf die Herausforderungen und Chancen einer digitalisierten Berufswelt vorbereitet. Durch eine Mischung aus technischer Expertise und wirtschaftlichem Verständnis entwickeln sie die Fähigkeit, innovative Ideen in erfolgreiche Unternehmungen umzusetzen. Der zweisprachige Ansatz des Studiums garantiert zudem exzellente Englischkenntnisse, was die Absolventinnen und Absolventen für den internationalen Markt attraktiv macht.

Studieninhalt

Die Lehrinhalte, strukturiert in drei modernen und arbeitsmarktnahen Vertiefungsrichtungen, adressieren essenzielle Themen wie Digitalisierung, Industrie 4.0 und Lieferketten- und Prozessoptimierung. Ergänzend bietet die Option eines Minors die Möglichkeit zur Spezialisierung in gefragten Bereichen beispielsweise wie Nachhaltigkeit, Entrepreneurship oder Künstliche Intelligenz. Durch diesen interdisziplinären und praxisnahen Ansatz sind die Studierenden in der Lage, innovative Lösungen für komplexe Herausforderungen zu entwickeln und anzuführen.

Zukunftsaussichten

Nach dem Studium können Absolvent*innen in verschiedenen Funktionen und Unternehmensbereichen tätig sein: Produktion und Logistik, Produktentwicklung, Einkauf, Vertrieb, Management und Organisation, IT- sowie Datenmanagement. Mit der Entwicklung künstlicher Intelligenz oder erweiterter Anwendungsformen der Blockchain-Technologie entstehen bereits jetzt spannende Berufsfelder, welche den Absolvent*innen des Bachelors of Science in Wirtschaftsingenieurwesen weitere Perspektiven eröffnen. Die bekannten und

La Haute école spécialisée bernoise BFH se distingue par ses formations dynamiques et tournées vers l'avenir, qui s'articulent autour des expériences pratiques et du développement de solutions innovantes. En plus de doter les étudiant-e-s de connaissances techniques actuelles, le cursus d'ingénierie de gestion du département Technique et informatique pousse les futur-e-s spécialistes à devenir des pionniers et pionnières de leur secteur d'activité. Il délivre une expérience d'apprentissage interdisciplinaire et internationale, étroitement liée à l'industrie, offrant une base solide sur laquelle asseoir une carrière prometteuse.

La filière de Bachelor en Ingénierie de gestion prépare les étudiant-e-s de manière optimale aux défis et aux opportunités d'un monde du travail numérique. Grâce à un mélange harmonieux d'expertise technique et de compréhension économique, ils et elles développent la capacité de transformer des idées innovantes en entreprises performantes. L'approche bilingue des études garantit en outre d'excellentes connaissances en anglais, ce qui ouvre aux diplômé-e-s les portes du marché international.

Contenu de la formation

Structurés selon trois orientations modernes prenant en compte les exigences du marché du travail, les cours se penchent sur des thèmes essentiels tels que la numérisation, l'industrie 4.0 et l'optimisation des chaînes d'approvisionnement et des processus. Le minor proposé en complément permet en outre de se spécialiser dans des domaines très dynamiques tels que développement durable, l'entrepreneuriat ou l'intelligence artificielle. Grâce à cette approche interdisciplinaire et pratique, les étudiant-e-s sont en mesure de concevoir et de mettre en œuvre des solutions innovantes pour des défis complexes.

Perspectives professionnelles

Ce cursus qualifie les diplômé-e-s pour divers postes et secteurs d'activité de l'entreprise: production et logistique, développement de produits, achat, vente, gestion et organisation, gestion informatique et gestion des données. Le développement de l'intelligence artificielle ou de formes étendues d'application de la chaîne de blocs (blockchain) lève le voile aujourd'hui déjà sur des domaines

Bern University of Applied Sciences BFH stands for a dynamic and future-oriented education that focuses on practical experience and innovative solutions. The School of Engineering and Computer Science is committed to equipping students on the BSc in Industrial Engineering and Management Science programme with cutting-edge knowledge. It also empowers them to become pioneers in their respective industries. The degree programme offers an interdisciplinary and international learning experience that is closely linked to industry, thus paving the way for a successful career.

The bachelor's degree programme in Industrial Engineering and Management optimally prepares students for the challenges and opportunities of a digitalised work environment. Highly proficient in technical expertise and business understanding, they can transform innovative concepts into thriving enterprises. The bilingual programme ensures that they acquire excellent English language skills, which enhances their competitiveness in the international job market.

Programme content

The content of the curriculum is structured into three modern and labour market oriented specialisations. It covers essential topics such as digitalisation, Industry 4.0 and supply chain and process optimisation. In addition, students can choose a minor to specialise in areas that are in high demand, such as sustainability, entrepreneurship or artificial intelligence. This interdisciplinary and practice-based approach enables them to develop and implement innovative solutions to complex challenges.

Career prospects

Students find employment opportunities in a wide range of roles and company divisions after graduation: production and logistics, product development, purchasing, sales, management and organisation, IT, data and quality management. The development of artificial intelligence and wider forms of application for blockchain technology are creating exciting new areas of employment, opening up further career opportunities for holders of a Bachelor of Science in Industrial Engineering and Management Science. Present and new job profiles in small, medium and large organisations include, for example, business analyst,

4 neuen Berufsbilder in kleinen, mittleren und grossen Organisationen sind beispielsweise: Business Analyst*in, Prozessmanager*in, Produktionsmanager*in, Projektmanager*in, Produktmanager*in, Data Analyst*in und Supply Chain Manager*in. Dank der Zweisprachigkeit des Studiengangs erlangen sie hervorragende Englischkenntnisse und werden so fit für den globalen Arbeitsmarkt.

Für diejenigen, die ihre Fachkenntnisse vertiefen möchten, bietet die BFH zudem anspruchsvolle Master-Programme an. Die Kombination aus hochwertiger Lehre, anwendungsorientierter Forschung und enger Industrieanbindung macht ein Studium am Departement Technik und Informatik an der BFH zu einer hervorragenden Wahl für angehende Wirtschaftsingenieur*innen, die an der Spitze des Fortschritts stehen wollen.

Erfahren Sie mehr über

- › den BSc Wirtschaftsingenieurwesen: bfh.ch/wing
- › das Departement Technik und Informatik: bfh.ch/ti
- › Forschung an der BFH: bfh.ch/ti/forschung
- › Weiterbildungsangebote am Departement Technik und Informatik: bfh.ch/ti/weiterbildung
- › ein Bachelor-Studium: bfh.ch/ti/bachelor
- › ein Master-Studium: bfh.ch/ti/master
- › die Zusammenarbeit mit der Industrie: bfh.ch/ti/projektidee
- › Entrepreneurship an der BFH-TI: bfh.ch/ti/entrepreneurship

passionnants qui ouvrent des débouchés supplémentaires aux titulaires du BSc en Ingénierie de gestion. Les profils professionnels actuels et les nouveaux métiers dans les petites, moyennes et grandes organisations foisonnent par exemple: analyste commercial, gestionnaire de processus, gestionnaire de production, gestionnaire de projet, gestionnaire de produit, analyste de données et gestionnaire de chaîne d'approvisionnement. La nature bilingue de la formation leur permet d'acquérir un excellent niveau d'anglais et d'étendre leurs perspectives professionnelles au marché mondial du travail.

La BFH propose également des programmes de master exigeants qui s'adressent à celles et ceux qui souhaitent approfondir leurs connaissances. En associant enseignement de qualité, recherche appliquée et étroite coopération avec l'industrie au sein d'une même formation, le département Technique et informatique de la BFH promet des études de premier ordre pour les futur-e-s ingénieur-e-s de gestion qui souhaitent s'installer à la pointe du progrès.

En savoir plus

- › BSc en Ingénierie de gestion: bfh.ch/ingenieriedegestion
- › le département Technique et informatique: bfh.ch/ti/fr
- › la recherche à la BFH: bfh.ch/ti/recherche
- › l'offre de formation continue du département Technique et informatique: bfh.ch/ti/formationcontinue
- › les études de bachelor: bfh.ch/ti/fr/bachelor
- › les études de master: bfh.ch/ti/fr/master
- › la collaboration avec l'industrie: bfh.ch/ti/idee-projet
- › l'entrepreneuriat à la BFH-TI: bfh.ch/ti/fr/entrepreneurship

process manager, production manager, project manager, product manager, data analyst and supply chain manager. Thanks to the programme's bilingual approach, the students gain a remarkable command of English and are well equipped for the global job market.

For those wishing to develop their expertise, BFH offers rigorous master's degree programmes. With its combination of high-quality teaching, application-oriented research and close links to industry, the School of Engineering and Computer Science at BFH is an excellent choice for prospective industrial engineers who want to be at the forefront of progress.

Find out more

- › BSc Industrial Engineering and Management Science: bfh.ch/wing
- › the School of Engineering and Computer Science: bfh.ch/ti/en
- › research at BFH: bfh.ch/ti/research
- › continuing education courses at the School of Engineering and Computer Science: bfh.ch/ti/continuingeducation
- › Bachelor studies: bfh.ch/ti/en/bachelor
- › Master studies: bfh.ch/ti/en/master
- › cooperation with industry: bfh.ch/ti/projectidea
- › entrepreneurship at BFH-TI: bfh.ch/ti/en/entrepreneurship

Steckbrief

Fiche signalétique

Fact Sheet

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Titel/Abschluss

Bachelor of Science (BSc)

Studienform

Vollzeitstudium (6 Semester) oder Teilzeitstudium (8 Semester oder individueller Studienplan) sowie praxisintegriertes Bachelor-Studium (8 Semester)

Unterrichtssprache

Zweisprachig Deutsch/Englisch. Je die Hälfte des Studiums wird auf Deutsch oder Englisch unterrichtet.

Majors (Vertiefungen)

Die Studierenden wählen im letzten Drittel ihres Studiums eine Vertiefung und setzen damit Akzente für die berufliche Karriere:

- **Digitalisierung – Business Engineering:** Unternehmen gestalten und steuern Management- und Innovationsprozesse in klassischen und digitalen Geschäftsmodellen. Sie optimieren Geschäftsprozesse, analysieren und visualisieren Daten, entwickeln Produkte und Services und setzen Innovationsmethoden ein.
- **Industrie 4.0 – Industrial Engineering:** Unternehmen optimieren Produktionssysteme, steuern Betriebsabläufe, wenden Operations Research an, simulieren betriebliche Prozesse und planen Ressourcen effizient in der Produktion.
- **Supply Chain und Process Engineering:** Unternehmen entwickeln Wertschöpfungsnetzwerke, definieren ihre Rolle darin, analysieren und automatisieren interne sowie externe Prozesse, implementieren Circular Supply Chains und nutzen moderne Technologien und Informationssysteme in der Logistik.

Minors (Schwerpunkte)

Ein Minor ist eine thematische Zusatzqualifikation neben der Vertiefungsrichtung.

- **Energie und Nachhaltigkeit:** Unternehmen entwickeln nachhaltige Strategien und Technologien zur effizienten Ressourcennutzung und Förderung erneuerbarer Energien.
- **Entrepreneurship:** Studierende entwickeln Geschäftsideen, gründen Unternehmen und setzen Strategien für Wachstum, Finanzierung und Markteinführung um.
- **Führung:** Führungskräfte steuern Unternehmen, entwickeln Teams und setzen Leadership-Konzepte zur Motivation und Entscheidungsfindung ein.

Titre/Diplôme

Bachelor of Science (BSc)

Forme des études

Études à plein temps (6 semestres), à temps partiel (8 semestres ou plan d'études individuel) ou bachelor intégrant la pratique (8 semestres)

Langues d'enseignement

Bilingue allemand/anglais. La moitié du cursus est dispensée en allemand, l'autre en anglais.

Majors (orientations)

Dans le dernier tiers de leur formation, les étudiant-e-s choisissent un major qui imprime un cap à leur future carrière:

- **Numérisation – Business Engineering:** les entreprises conçoivent et traitent des processus de gestion et d'innovation à l'aide de modèles d'affaires classiques et numériques. Elles optimisent les processus commerciaux, analysent et visualisent les données, développent des produits et des services et usent de méthodes d'innovation.
- **Industrie 4.0 – Industrial Engineering:** les entreprises optimisent les systèmes de production, gèrent les modes opératoires, appliquent la recherche opérationnelle, simulent les processus opérationnels et planifient efficacement les ressources dans la production.
- **Supply Chain et Process Engineering:** les entreprises développent des réseaux de création de valeur et y définissent leur rôle, analysent et automatisent les processus internes et externes, mettent en œuvre des chaînes d'approvisionnement circulaires et emploient des technologies et des systèmes d'information modernes dans la logistique.

Minors (dominantes)

Un minor vous dote d'une qualification thématique supplémentaire en plus de l'orientation.

- **Énergie et durabilité:** les entreprises développent des stratégies et des technologies durables pour utiliser efficacement les ressources et promouvoir les énergies renouvelables.
- **Entrepreneuriat:** les étudiant-e-s développent des idées commerciales, créent des entreprises et appliquent des stratégies de croissance, de financement et de lancement sur le marché.

Title/degree

Bachelor of Science (BSc)

Mode of study

Full-time (6 semesters) or part-time (8 semesters or individual curriculum) and work-study Bachelor's degree programme (PiBS) (8 semesters).

Language of instruction

Bilingual German/English. Half of the modules are taught in German and half in English.

Majors (specialisations)

In the third part of the programme, students choose a specialisation, setting the course for their future career:

- **Digitisation – Business Engineering:** companies design and control management and innovation processes in traditional and digital business models. They optimise business processes, analyse and visualise data, develop products and services and apply innovation methods.
- **Industry 4.0 – Industrial Engineering:** companies optimise production systems, control operational processes, apply operations research, simulate operational processes and plan resources efficiently in production.
- **Supply Chain and Process Engineering:** companies develop value creation networks, define their role within them, analyse and automate internal and external processes, implement circular supply chains and use modern technologies and information systems in logistics.

Minors (focuses)

A minor is an additional thematic qualification that complements the specialisation.

- **Energy and Sustainability:** companies develop sustainable strategies and technologies for the efficient use of resources and the promotion of renewable energies.
- **Entrepreneurship:** students develop business ideas, create companies and implement strategies for growth, financing and market launch.
- **Management:** people in such roles manage companies, develop teams and use leadership concepts to enhance motivation and decision-making processes.

- **Product Owner:**
Verantwortliche definieren Produktvisionen, priorisieren Anforderungen und steuern agile Entwicklungsprozesse.
- **Artificial Intelligence:**
Entwickler programmieren KI-Systeme, nutzen maschinelles Lernen und neuronale Netze für innovative Anwendungen.

Abschlussarbeit

Während des Studiums erhalten die Studierenden wertvolle Inhalte in unseren Living Labs und beschäftigen sich mit Projekten aus der Praxis.

Kontakt

032 321 64 13 (Sekretariat)
032 321 61 11 (Studierendenadministration)
wirtschaftsingenieur@bfh.ch

Mehr Informationen

bfh.ch/wing

- **Direction :**
les cadres dirigent des entreprises, développent des équipes et utilisent des concepts de leadership pour motiver leur personnel et prendre des décisions.
- **Product Owner :**
les responsables dévoilent leurs visions en matière de produits, hiérarchisent les exigences et gèrent des processus de développement agiles.
- **Intelligence artificielle :**
les développeurs et développeuses programment des systèmes d'IA, utilisent l'apprentissage automatique et les réseaux neuronaux pour des applications innovantes.

Travail de fin d'études

Pendant leur formation, les étudiant-e-s acquièrent un savoir précieux dans nos Living Labs et se consacrent à des projets issus de la pratique.

Contact

032 321 64 13 (secrétariat)
032 321 61 11 (Administration des étudiant-e-s)
wirtschaftsingenieur@bfh.ch

Informations supplémentaires

bfh.ch/ingenieriedegestion

- **Product Owner:**
a person in charge of a product defines product visions, prioritises requirements and manages agile development processes.
- **Artificial Intelligence:**
developers programme AI systems and use machine learning and neural networks for innovative applications.

Graduation thesis

During their studies, students learn valuable skills in our Living Labs and complete practical projects.

Contact

032 321 64 13 (secretariat)
032 321 61 11 (Student Administration)
wirtschaftsingenieur@bfh.ch

More information

bfh.ch/wing



Interviews mit Studierenden

Interviews d'étudiant-e-s

Interviews with students

8



Angelina Joana Candaten

Warum haben Sie sich für dieses Studium entschieden?

Ich wollte mehr als reine Betriebswirtschaft studieren und fand insbesondere Themen rund um IT und Technologien sehr spannend. Die Kombination aus Wirtschaft, Technik und Informatik hat mich überzeugt, da sie viele Möglichkeiten eröffnet und sehr zukunftsorientiert ist.

Was gefiel Ihnen besonders gut an diesem Studium?

Besonders gut gefallen hat mir die Praxisorientierung mit Gastvorlesungen sowie auch Exkursionen zu Industriepartnern. Zudem ist das Studium über die drei Säulen Wirtschaft, Technik und Informatik hinweg mit interdisziplinären Modulen sehr breit gefächert, wodurch man viele unterschiedliche Themen kennenlernt und herausfinden kann, wo die eigenen Stärken und Interessen liegen.

Wie sah der Studienalltag aus?

Der Studienalltag war abwechslungsreich und bestand aus Vorlesungen, Gruppenarbeiten, Projekten und Präsentationen. Viele Inhalte hatten einen direkten Praxisbezug, wodurch man das Gelernte besser anwenden konnte.

Arbeiteten Sie nebenher? (während des Semesters oder während der Ferien)

Ja, ich habe während des gesamten Studiums 60 % gearbeitet. Mein Job hatte zwar keinen direkten Bezug zum Studium, trotzdem konnte ich viele Inhalte aus dem Studium wie zum Beispiel Business Development oder Prozessanalysen und -optimierungen immer wieder übertragen und dort anwenden.

Was waren die grössten Herausforderungen im Studium?

Eine Herausforderung war es, die verschiedenen Themenbereiche miteinander zu verbinden und parallel mehrere Projekte zu bearbeiten. Gleichzeitig musste man lernen, Prioritäten zu setzen und sich gut zu organisieren.

Was möchten Sie nach dem Studium machen und was machen Sie heute beruflich?

Aktuell arbeite ich in der Personalentwicklung und koordiniere Weiterbildungen, unterstütze interne Prozesse, arbeite eng mit verschiedenen Schnittstellen zusammen und sammle zusätzlich Erfahrung im Marketing in einem American Football Verein. Nach dem Studium möchte ich gerne im Consulting arbeiten und Unternehmen bei Reorganisationen sowie bei strategischen Fragestellungen begleiten.

Inwiefern können Sie von Ihrem Studium profitieren?

Neben neuem Wissen in technischen und IT-Themen konnte ich mich auch persönlich stark weiterentwickeln. Besonders die Zusammenarbeit in Projekten und Präsentationen hat meine Kommunikations- und Teamfähigkeiten verbessert.

Welchen Tipp haben Sie für jemanden, der dieses Studium in Betracht zieht?

Das Studium ist herausfordernd, aber es lohnt sich dafür umso mehr. Es gehört irgendwie dazu, dass man dabei auch einmal durch ein «Tal der Tränen» geht -- es hilft aber dann zu wissen, dass es den meisten Studierenden zeitweise ähnlich geht und Herausforderungen normal sind. Das Studium ist breit aufgebaut, sodass jede Person Themen findet, die ihr besonders liegen. Mein Tipp: immer offenbleiben und dranbleiben lohnen sich.



Lorenz Rügsegger

Warum haben Sie sich für dieses Studium entschieden?

Nach meiner Lehre als Konstrukteur sowie dem Abschluss der Berufsmaturität war für mich klar, dass ich noch ein Ingenieursstudium machen möchte. Da ich beruflich nebst den technischen Aufgaben auch mit vielen betriebswirtschaftlichen Fragen konfrontiert bin, entschied ich mich für den Wirtschaftsingenieur, da dieser einen modernen Mix aus technischen Disziplinen wie Maschinenbau, Elektrotechnik, Informatik und eben auch Betriebswirtschaft aufweist.

Was gefiel Ihnen besonders gut an diesem Studium?

Im Wirtschaftsingenieursstudium erhält man umfangreiche Einblicke in viele unterschiedliche Disziplinen. Dies erlaubt einem, Probleme ganzheitlich anzugehen und komplexe Fragestellungen in lösbare Elemente herunterzubrechen. Häufig neigen Betriebe dazu, Probleme in Silos isoliert zu lösen. Als Wirtschaftsingenieur

kann man hier Grenzen durchbrechen und Lösungen konzipieren, welche für alle Beteiligten einen Mehrwert schaffen. Diese gesamtheitliche Herangehensweise fasziniert mich.

Wie sah der Studienalltag aus?

Im Studium hatten wir auch klassische «Paukfächer» wie Mathematik, Statistik, Physik und Programmierung, wo zwischendurch neben den trockenen Vorlesungen auch zuhause für einen humorlosen Test gebüffelt werden darf. Diese waren aber gut machbar und der Nutzen zeigt sich: Auf Basis dieser Grundlagen gibt es in anderen Fächern Projektarbeiten, viele davon im Team, praxisorientiert und mit viel Freiraum für eigene Ideen. Die Vertiefungsmodule waren geprägt von ergänzenden Exkursionen und Fallbeispielen mit grossem Praxisbezug.

Arbeiteten Sie nebenher? (während des Semesters oder während der Ferien)

Ich bin Teilzeit jedoch mit einem relativ hohen Beschäftigungsgrad angestellt. Da ich während den Semesterferien 100% arbeiten kann, geht dies über das gesamte Jahr hin gut auf. Mittlerweile bin ich in dem KMU als Mitglied der Geschäftsleitung aktiv.

Was waren die grössten Herausforderungen im Studium?

Für mich persönlich war das wissenschaftliche Schreiben der Berichte und Projektarbeiten herausfordernd, da ich von meinem Naturell her eher pragmatisch veranlagt bin. Im Nachhinein empfinde ich es allerdings als sehr bereichernd, da es meine Fähigkeiten an Dinge systematisch, strukturiert und präzise heranzugehen weiter gestärkt hat.

Was möchten Sie nach dem Studium machen und was machen Sie heute beruflich?

2024 hatte ich die Gelegenheit als Nachfolgeunternehmer bei der AA-Protun AG, einem Engineering Unternehmen im Recyclingbereich einzusteigen. Ich habe mittlerweile die Geschäftsführung übernommen und freue mich, mich nun nach dem Studium voll und ganz darauf fokussieren zu können.

Inwiefern können Sie von Ihrem Studium profitieren?

Als Anlagenbauer muss man für Kunden Systemlösungen bieten können, welche technisch die Anforderungen erfüllen und ökonomischen Wert bringen. Damit die passende Lösung entwickelt werden kann, muss man Prozesse analysieren, Maschinen technisch beurteilen und finanzielle Abwägungen machen. Mit dem Studium konnte ich meine «Toolbox» erweitern, um genau das zu tun.

Welchen Tipp haben Sie für jemanden, der dieses Studium in Betracht zieht?

Dieses Studium ist ideal für alle, die gerne ganzheitlich und vernetzt denken und Fragestellungen im Unternehmen aus einer übergreifenden Perspektive angehen. Wenn du ein breites Interesse an technischen und wirtschaftlichen Themen hast und dich nicht auf ein einzelnes Fachgebiet beschränken möchtest, ist Wirtschaftsingenieurwesen genau das richtige Studium für dich.

Zusammenarbeitsformen

Formes de collaboration

Collaboration

10 Neue Erkenntnisse gewinnen, Synergien schaffen, Praxisnähe erfahren: Die Berner Fachhochschule arbeitet in der angewandten Forschung und Entwicklung eng mit der Wirtschaft und der Industrie zusammen. Dadurch wird die Verknüpfung von Forschung und Lehre gestärkt und es fließt neues Wissen in den Unterricht ein. Dies führt zu einer qualitativ hochwertigen und praxisnahen Lehre. Damit Unternehmen bereits heute die Spezialistinnen und Spezialisten von morgen kennenlernen oder sich an eine Thematik herantasten können, besteht die Möglichkeit, Projekt- oder Abschlussarbeiten in Zusammenarbeit mit Studierenden durchzuführen. Als Wirtschaftspartner können Sie Themen vorschlagen. Werden Themen gewählt, bearbeiten Studierende diese alleine oder in kleinen Gruppen in dafür vorgesehenen Zeitfenstern selbstständig. Dabei werden die Studierenden von ihrer Fachperson sowie einer Dozentin oder einem Dozenten der Berner Fachhochschule betreut. Die Rechte und Pflichten der beteiligten Parteien werden in einer Vereinbarung geregelt.

Möchten Sie Themen für studentische Arbeiten vorschlagen und mehr über eine mögliche Zusammenarbeit erfahren? Kontaktieren Sie uns und überzeugen Sie sich vom Innovationspotenzial unserer Studierenden.

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Acquérir de nouvelles connaissances, créer des synergies, découvrir la pertinence pratique : dans le domaine de la recherche appliquée et du développement, la Haute école spécialisée bernoise travaille en étroite collaboration avec l'économie et l'industrie. Le lien entre la recherche et la formation est ainsi renforcé et l'enseignement profite des nouvelles connaissances. Il en résulte une formation de grande qualité, axée sur la pratique. Pour que les entreprises puissent faire aujourd'hui déjà la connaissance des spécialistes de demain ou aborder un sujet particulier, elles ont la possibilité de réaliser des projets ou des travaux de fin d'études en collaboration avec des étudiant-e-s. En tant que partenaire économique, vous pouvez proposer des thèmes. S'ils sont choisis, les étudiant-e-s les traitent ensuite de manière autonome, seul-e-s ou en petits groupes, dans les créneaux horaires prévus à cet effet. Ils et elles sont encadré-e-s par votre spécialiste ainsi que par un-e enseignant-e de la Haute école spécialisée bernoise. Une convention régit les droits et obligations des parties au projet.

Souhaitez-vous proposer des thèmes pour des travaux d'étudiant-e-s et en savoir plus sur une éventuelle collaboration ? Contactez-nous et laissez-vous convaincre par le potentiel d'innovation de nos étudiant-e-s.

bfh.ch/ti/idee-projet

Gain new insights, create synergies, experience practical relevance: Bern University of Applied Sciences BFH works closely with business and industry in areas of applied research and development. This strengthens the link between research and education, allowing new knowledge to flow into our teaching, which leads to high-quality and practice-oriented degree programmes. In order for companies to meet our future specialists or to explore a topic, they can carry out projects or theses in cooperation with our students. As a business partner, you can suggest topics. Once these topics are selected, the students work on the projects independently, either individually or in small groups, within designated time frames. They are supervised by both your specialist and a BFH lecturer. The rights and obligations of the parties involved are set out in a written agreement.

Would you like to suggest topics for student projects and find out more about a possible cooperation? Contact us and convince yourself of the innovation potential of our students.

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Studentische Arbeiten | Travaux d'étudiant-e-s | Student projects

Das Modell einer flexiblen Zusammenarbeit mit Industrie und Wirtschaft wird in studentischen Arbeiten erfolgreich umgesetzt:
La flexibilité du modèle de collaboration avec l'industrie et l'économie se concrétise avec succès dans les travaux d'étudiant-e-s:
The model of flexible cooperation with industry and business is successfully implemented in student projects:



Semesterarbeiten, Bachelor-Thesis, Master-Thesis
Travaux de semestre, travail de bachelor, mémoire de master
Semester projects, bachelor thesis, master thesis



Wochen bis Monate
De quelques semaines à plusieurs mois
Several weeks or months



Kostenbeitrag zulasten des Auftraggebers
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durchgeführt von Expertinnen und Experten
Planification, coaching, tests, expertises, analyses par des expert-e-s
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Monate bis Jahre
De quelques mois à plusieurs années
Several months or years



Teilfinanziert durch
öffentliche Fördergelder
Financement partiel par
des subventions publiques
Partly public funding

Industriepartner

Partenaires industriels

Industry partners

- 12 Eine enge Zusammenarbeit mit Industriepartnern ist uns äusserst wichtig. Zahlreiche Abschlussarbeiten sind in Kooperation mit Firmen aus der ganzen Schweiz entstanden. Wir bedanken uns bei diesen Firmen für die fruchtbare Zusammenarbeit!

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À nos yeux, une collaboration étroite avec des partenaires industriels est extrêmement importante. De nombreux mémoires se font en partenariat avec des entreprises de toute la Suisse. Nous remercions ces entreprises pour cette fructueuse collaboration!

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A close cooperation with industrial partners is very important to us. Numerous bachelor's theses have been produced in cooperation with companies from Switzerland. We thank these companies for the fruitful collaboration!

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3D Print Core Facility University of Basel, Allschwil
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PB Swiss Tools AG, Wasen im Emmental
PRiOT AG, Burgdorf
Provoqué GmbH, St. Pantaleon
Stiftung Südkurve, Lyss
SwissICT, Zürich
Ziemer Ophthalmic Systems AG, Port



Liste der Studierenden

Liste des étudiant-e-s

List of students

14 Im Folgenden präsentieren wir Ihnen die Zusammenfassungen der Abschlussarbeiten des Jahres 2026.

Die Studierenden sind in alphabetischer Reihenfolge aufgeführt.

Die Studierenden haben die Texte – teils mit Unterstützung der betreuenden Dozierenden – selbst verfasst. Die Texte wurden vor Publikation nicht systematisch redigiert und korrigiert.

Ci-après, nous vous présentons les résumés des travaux de fin d'études de l'année 2026.

Les étudiant-e-s sont présenté-e-s par ordre alphabétique.

Les étudiant-e-s ont rédigé les textes de façon autonome, parfois avec l'aide des enseignant-e-s qui les encadrent. Les textes n'ont pas systématiquement été relus ou corrigés avant publication.

On the next pages, we have summarised the 2026 graduation theses.

The students are listed in alphabetical order.

The texts were written by the students themselves, with some support from their lecturers. They were not systematically edited or corrected before publication.

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Business Engineering

Building an Ecological and Social Sustainability Measurement System for Construction

Degree programme: BSc in Industrial Engineering and Management Science

Specialisation: Business Engineering

Thesis advisor: Prof. Dr. Maria Franco Mosquera

Expert: Dr. Ässia Boukhatmi

Industrial partner: HOME OF BEACH AG, Bern

16

This project presents a sustainability measurement system for the Home of Beach project in Bern. By integrating Building Information Modeling (BIM) models, an environmental database, material data and stakeholder information, the system enables the quantification and visualization of environmental, circularity and social performance. The framework supports transparent reporting and future monitoring throughout the building lifecycle.



Tina Andacic

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Introduction and Objectives

In Switzerland, the construction sector accounts for approximately 71% of material consumption, 24% of greenhouse gas emissions and 80% of total waste generation. Despite increasing sustainability ambitions, many construction projects still struggle to measure sustainability performance due to fragmented and incomplete data, limiting informed decision making and transparent reporting. This thesis focuses on the Home of Beach (HOB) project in Bern, a five storey beach sports and community facility with ambitious sustainability goals. The objective was to develop a practical sustainability measurement system capable of quantifying sustainability performance under real world data constraints.

Research Design

A case study approach was applied using Building Information Modeling (BIM) models, Madaster (a material passport platform), KBOB (the Swiss construction environmental database), supplier and project data. Custom Python workflows automated data extraction, harmonization and material mapping, resulting in a structured sustainability dataset. Environmental and circularity indicators covered material production, transport, construction and selected end of life processes, while operational indicators for the use phase were defined for future monitoring. Social indicators covered employment, accessibility, commu-

nity impact and occupational health and safety. The resulting dataset was integrated into three Power BI dashboards covering environmental, circularity and social performance (Figure 1).

Results

The developed framework operationalized the selected indicators despite significant data limitations. The assessment quantified approximately 1.24 million kg CO₂e and identified concrete and reinforcement steel as major hotspots. Circularity results included 3,084 tonnes of primary raw materials saved, 24.9 tonnes of permanently sequestered CO₂ through recycled concrete and a Detachability Index of 60%. Social indicators were established, including an Occupational Health and Safety (OHS) score of 4.29 out of 5. The dashboards provide a transparent sustainability overview.

Implications and Recommendations

The findings demonstrate that sustainability measurement is feasible but requires substantial data harmonization and stakeholder collaboration. Future projects should integrate sustainability requirements directly into BIM workflows and establish standardized sustainability data structures from early project phases. The methodology provides a transferable framework for sustainability management in construction projects.

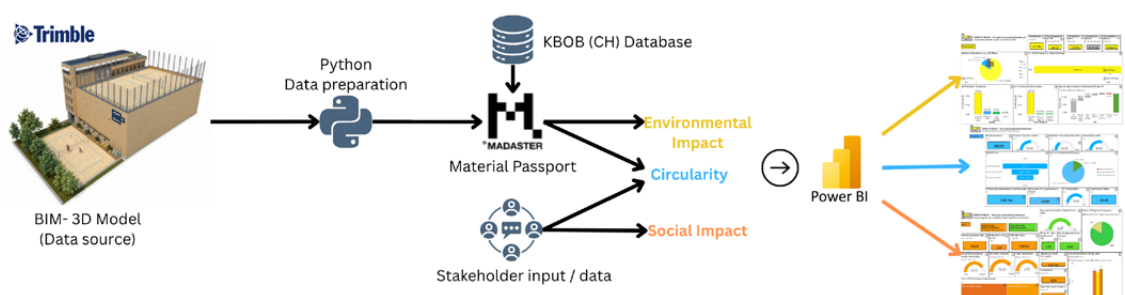


Figure 1: System architecture of the sustainability assessment framework

Resource Efficiency in Stakeholder-related Processes in Non-Profit Organizations

Degree programme : BSc in Industrial Engineering and Management Science
Specialisation : Business Engineering
Thesis advisor : Moritz Maier
Expert : Jeremy Henrichs
Industrial partner : Stiftung Südkurve, Lyss

17

Growth helps NPOs increase their impact, but it also multiplies coordination effort, information gaps and stakeholder complexity. This thesis develops a practical evaluation framework that helps NPOs uncover where stakeholder-related processes lose efficiency, why these weaknesses emerge and how measurable improvements can be achieved. Developed with Stiftung Südkurve, the framework connects resource efficiency, stakeholder value and digital transformation.

Introduction and Objectives

Non-profit organizations must manage diverse stakeholder expectations while operating with limited resources. As organizations grow, processes often evolve informally, leading to fragmented information, unclear ownership and increasing coordination effort. This thesis develops a structured framework for evaluating stakeholder-related processes. Its objective is to support Stiftung Südkurve in improving process transparency, resource efficiency and stakeholder management while providing an approach that can also be transferred to other growing NPOs.

Research Method

The study combines literature on Business Process Management, Customer Relationship Management and Non-Profit Management with more than ten internal interviews, four external expert interviews and two process applications. These findings are triangulated to develop the Stakeholder-related Process Evaluation Framework (SPEF). A standardized Process Evaluation Sheet operationalizes the framework and is applied to fundraising and Customer Support and Data Management as two contrasting and practically relevant process types.

Results

The findings show that visible inefficiencies often result from capability gaps in governance, process design, data, knowledge and performance management. In fundraising, the proposed improvements may reduce coordination effort up to 50 employee hours per campaign. In customer support, improved First Contact Resolution could avoid around 2'000 internal handovers and save around 60 employee hours per year. SPEF translates these findings into prioritized measures, KPIs and practical To-be processes.

Implications and Recommendations

The thesis provides Stiftung Südkurve with a practical framework for moving from isolated improvements towards systematic capability development. SPEF combines process evaluation, root-cause analysis and measurement logic for stakeholder-related NPO processes. The findings indicate that digitalization should not begin with technology. Clear ownership, selective standardization and reliable information structures must come first, so technology can scale effective processes instead of digitizing inefficiencies. Lightweight organizational measures should therefore precede larger system changes.



Lukas Baumgartner
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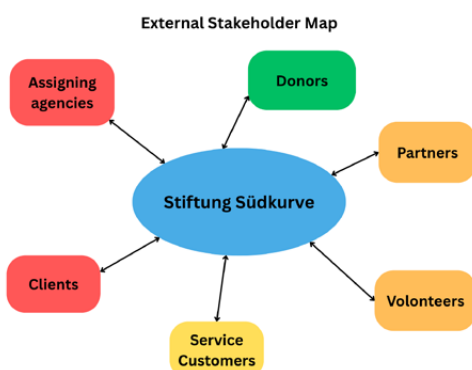


Figure 1: External Stakeholder Map of Stiftung Südkurve

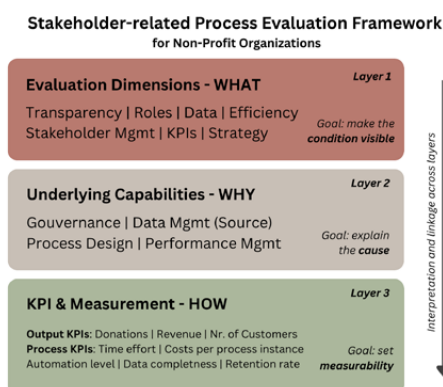


Figure 2: Process Evaluation Framework for NPOs (simplified)

Funded in Seven Minutes: How Micro-Deposits decide Crowdfunding Campaigns before Launch

Degree programme : BSc in Industrial Engineering and Management Science
Specialisation : Business Engineering
Thesis advisor : Jeremy Henrichs
Expert : Dr. Ässia Boukhatmi
Industrial partner : Provoqué GmbH, St. Pantaleon

18

Can the outcome of a crowdfunding campaign be predicted before launch? The evidence of this thesis suggests it can - if customers commit with money instead of email addresses. The Swiss watch brand Provoqué launched a modular watch with dials cut from upcycled CDs on Kickstarter, reaching its funding goal in seven minutes. Leads who had paid a small deposit converted 58 times more often than email sign-ups.



Noel Yannic Benz
info@provoquewatches.com

Introduction and Objective

Launching a new product is a high-risk decision for a young company: production requires investment months before the first sale. Reward-based crowdfunding reverses this order. Practitioners claim that campaigns are decided before launch: customers who pay a small deposit to reserve their price are said to be far more likely to actually buy than customers who only leave their email address. This claim has never been tested academically and it is contested, because a payment step also deters sign-ups. The objective is to test it under live market conditions.

Research Design

The thesis follows the Double Diamond framework: discover, define, develop, deliver. The discover phase benchmarked the 185 most funded Kickstarter watch campaigns and combined them with academic literature. The define phase condensed this into twelve campaign requirements and four hypotheses. The develop phase implemented these for a modular watch with dials milled from upcycled CDs. On the engineering side, this meant a two-module architecture and a milling process turning CDs into dials. On the IT side, a two-step reservation funnel with payments, email automation and stage-by-stage tracking was built. A custom-built cutout tool lets backers upload a CD photo, select their dial section and submit it before sending in the CD. The deliver phase was the live Kickstarter launch, testing every hypothesis.



Figure 1: The modular watch with dials cut from upcycled CDs.

Results

Over 30 days, the campaign raised CHF 37'644 from 155 backers. The funding goal was crossed after seven minutes and CHF 20'525 arrived within the first 24 hours. The central claim held: depositors converted into backers 58 times more often than email-only leads (Figure 2, left). Conversion rose with deposit size, yet cost worked against it: once advertising spend is included, the CHF 5 deposit achieved the lowest net acquisition cost per backer, while CHF 10 proved clearly uneconomical (Figure 2, right). Deposit size shifts the balance between lead volume and lead quality; whether one amount can optimise both remains to be tested.

Implications and Recommendations

The work provides the first independent field evidence on the micro-deposit mechanism. For creators, three recommendations follow: build a deposit funnel rather than an email list, test deposit amounts in parallel before scaling, and resource the entire campaign duration - the funding curve followed campaign activity almost one to one. Two questions remain for future work: whether the deposit causes purchases or only reveals the buyers who would have purchased anyway, and whether a low, quickly reached funding goal is optimal at all or whether an ambitious goal attracts platform support that a campaign funded in minutes no longer receives.

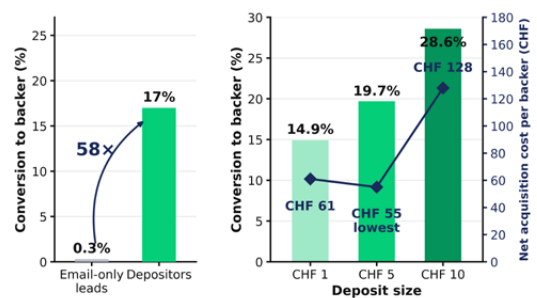


Figure 2: Left: backer conversion of email leads vs. depositors. Right: conversion and net cost per backer by deposit tier.

Reconstructing an opaque market: U.S. Ophthalmology Market Research and Analysis

Degree programme : BSc in Industrial Engineering and Management Science

Specialisation : Business Engineering

Thesis advisor : Prof. Dr. Bastian Widenmayer

Expert : Thomas Blaser

Industrial partner : Ziemer Ophthalmics Systems AG, Port

19

The U.S. FLACS market is commercially important yet statistically or even structurally opaque: no reliable source directly reports penetration, installed base, or competitive structure. This thesis reconstructs the market through a first-principles triangulation of reimbursement, pricing, regulatory disclosures, clinical economics, and regional demand signals to estimate market development, geographic concentration, facility-level incentives, and strategic opportunity.

Introduction and Objectives

The U.S. femtosecond laser-assisted cataract surgery (FLACS) market is commercially relevant but statistically opaque: no single dataset reliably reports installed base, procedure volume, penetration, or competitive structure. U.S. cataract volume already runs at roughly 3.8 million cases per year and is likely to grow as the population ages, widening the pool for premium cataract procedures. The goal of this thesis is not to summarize the literature, but to reconstruct the U.S. FLACS market as defensibly as possible.

Research design

The study uses a triangulation-based secondary research design combining top-down and bottom-up market sizing within a reproducible, assumption-driven Excel model. Anchoring source streams include, among others: OEM disclosures, CMS reimbursement data, FDA regulatory records, U.S. Census demographics, public-health facility footprints, and 150+ manually reviewed clinic websites. Cross-checks follow a simple logic: inconsistent signals across the combined sources trigger a revision of assumptions until procedure volumes, unit placements, and demand patterns are broadly consistent with reported OEM revenue figures. This creates a transparent model.

Results

The analysis identified several noteworthy patterns regarding market adoption, reimbursement dynamics, and competitive positioning. Overall, the findings suggest that technology utilization, economic incentives, and regional market characteristics vary considerably across the market. In addition, differences in reimbursement structures indicate that financial incentives are not distributed uniformly across stakeholders. Finally, the analysis highlights geographic variation in pricing and competitive intensity, suggesting that market opportunities are concentrated in selected locations rather than being evenly distributed.

Implications and recommendations

The findings indicate that, while the technology may not be universally advantageous across all clinical and economic settings, opportunities exist within specific market segments and use cases. Strategic priorities should therefore focus on identifying areas with favorable market conditions, optimizing deployment in appropriate care settings, and targeting applications where the technology is expected to deliver the greatest value. These insights can help guide market development, commercial strategy, and future investment decisions.



Cyran C. Bickel

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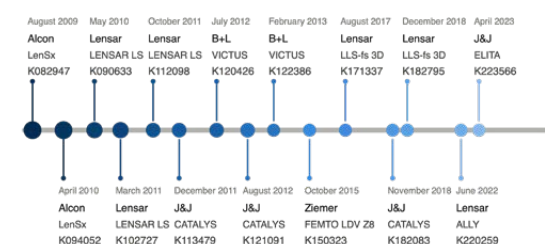


Figure 1: Most Important FDA Approvals of OEM as a Timeline

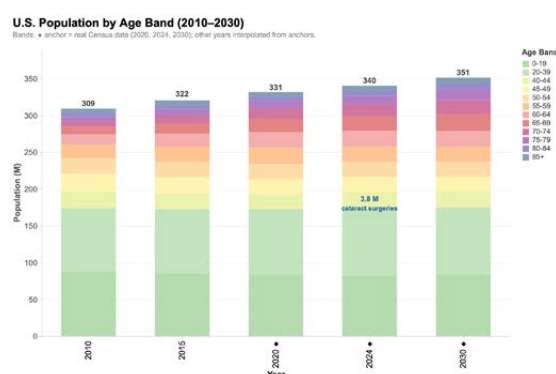


Figure 2: U.S. Population & Cataract Surgeries

BlackMarlin: A Focused System Architecture for Swim-Specific Training Feedback

Degree programme : BSc in Industrial Engineering and Management Science
Specialisation : Business Engineering
Thesis advisor : Prof. Dr. Bastian Widenmayer
Expert : Dr. Panos Dimitropoulos

20

Existing swim-tracking devices provide basic data, but swimmers and triathletes still face multiple limitations in distance measurement, lap tracking and weak in-water feedback. This thesis uses a Product Discovery approach to translate user needs, requirements and sensor-placement insights into a focused system architecture for BlackMarlin, aiming to balance reliable tracking, meaningful feedback and practical wearability during swimming.



Lukas Matthias Brunner

Introduction and Objectives

Current swim-tracking solutions only partially meet the needs of swimmers and triathletes. While existing devices capture basic metrics, users still report limitations in distance measurement, lap detection, pace feedback and actionable in-water guidance. The objective of this thesis is to derive a user-centred product direction and system architecture for BlackMarlin. The thesis focuses on Product Discovery: clarifying user needs, structuring requirements and identifying a feasible product direction.

Research Design

The research combines literature and qualitative interviews with swimmers and triathletes. During the interview, participants discussed current tracking problems, relevant training needs and acceptable sensor placements. Sensor-position sketches were used to explore where tracking elements could be worn without disturbing swimming. The interview data were analysed and translated into requirement groups, market segments, product concepts and architecture decisions.

Results

The findings show that BlackMarlin must first ensure reliable core tracking, including distance, lap detection, time, stroke detection and basic pace. Performance Feedback emerged as the strongest differentiating need, especially for structured swimming sessions. Physiological Feedback and Technique

Analysis are relevant, but they are more dependent on user segment, sensor acceptance and technical complexity. Three product concepts were derived from the analysis.

- CoreFlow: Combines one wrist sensor with one compact sensor on the goggle strap. It focuses on reliable basic data and robust session orientation.
- Pace Guide: Adds a second wrist sensor to enable bilateral stroke and rhythm analysis for structured training evaluation.
- InsightPro: Extends the system with a chest strap and one ankle sensor to support physiological data and kick-related analysis for deeper performance and technique insights.

Implications and Recommendations

BlackMarlin should not be positioned as another generic multisport watch. The strongest opportunity lies in a swim-specific solution that provides reliable tracking and meaningful feedback while remaining practical to wear. The final architecture follows a modular logic: CoreFlow offers the simplest entry point, PaceGuide provides the recommended balance for structured performance training and InsightPro adds further analytical depth for users with higher data needs.



Figure 1: Product Discovery process for BlackMarlin, translating user needs into requirements, sensor-placement insights and a focused architecture decision.

Requirement Groups	Description	CoreFlow Reliable training orientation	PaceGuide Structured performance training	InsightPro Deep technical analysis
Core Tracking	Distance, laps, time, stroke, basic pace	+	+	+
Performance Feedback	Pace, interval guidance, live feedback	+/-	+	+
Physiological Feedback	Heart rate, HR zones, load	-	+/-	+
Technique Analysis	Stroke metrics, symmetry, body position	-	+/-	+
Wearability & Acceptance	Comfort, low interruption	+	+/-	- (segment-dependent)
		+ High – strong fit	+/- Medium – partial fit	- Low – limited fit

Figure 2: Requirement coverage matrix comparing the three BlackMarlin product concepts across key requirement groups

Data-Driven Social Media Growth for Youth Recruitment – Case Study Bienna Jets

Degree programme : BSc in Industrial Engineering and Management Science
Specialisation : Business Engineering
Thesis advisor : Jeremy Henrichs
Expert : Dr. Ässia Boukhatmi
Industrial partner : AFC Bienna Jets, Biel/Bienne

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Youth sports clubs increasingly use social media to attract new players, yet little evidence exists on which strategies contribute most effectively to recruitment. This study evaluates data-driven social media growth and recruitment initiatives implemented by the Bienna Jets American Football club. Results indicate that community-focused content increases engagement and visibility, while personal relationships remain the strongest driver of player acquisition and retention.

Introduction & Objectives

American football remains a niche sport in Switzerland and depends heavily on continuous youth recruitment. At the same time, social media offers new opportunities to reach potential players. This study evaluates how data-driven social media and recruitment initiatives can support youth player acquisition within the Bienna Jets American football club. As a volunteer-run grassroots organisation, the club provides a practical setting for evaluating scalable recruitment strategies under limited financial and human resources.

Methodology

This study employed a mixed-method case study approach combining prospective social media experiments with retrospective recruitment analyses. Seven hypotheses were tested to evaluate different content formats, recruitment initiatives, and social media strategies. Quantitative data included social media performance metrics, recruitment statistics, website inquiries, and survey results, while qualitative insights were derived from open survey responses and recruitment source analyses. Together, these data sources enabled the evaluation of both online engagement and offline recruitment outcomes within a grassroots sports organisation.

Key Findings

Community-focused content, game-day highlights, team-oriented posts, and authentic football scenes generated strong engagement, while recruitment-focused posts and incentive-based campaigns produced limited results. The findings indicate that young athletes are more attracted by authentic insights into team life than by traditional promotional messages.

The strongest recruitment outcomes were linked to personal relationships. The Bring-a-Friend initiative converted seven of nine invited participants into new players, corresponding to a conversion rate of 77.8%, while surveys and recruitment data identified friends, teammates, and existing players as the most important recruitment sources.

Implications & Recommendations

The findings indicate that social media and recruitment should not be viewed as separate processes. While digital platforms effectively increase visibility and engagement, personal relationships appear to play a decisive role in converting interest into active participation and long-term retention.

“Social media creates awareness. Personal relationships create players.”

This statement summarises the author's interpretation of the combined findings. For youth sports clubs, the most effective recruitment strategy is therefore a combination of engaging digital content, authentic community-driven communication, and structured referral initiatives. Rather than relying solely on promotional content, clubs may achieve greater recruitment success by strengthening community identity and encouraging existing players to act as ambassadors. The findings were consolidated into the Youth Recruitment Playbook (Figure 1), translating the research results into practical recommendations for grassroots youth sport organisations.



Angelina Joana Candaten



Figure 1: Youth Recruitment Playbook developed from the study findings

Operational Relief in Property Management through Tenant Self-Governance of Shared Laundry

Degree programme: BSc in Industrial Engineering and Management Science

Specialisation: Business Engineering

Thesis advisor: Prof. Dr. Bastian Widenmayer

Expert: Jeremy Henrichs

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Shared laundry facilities are a frequent source of emotional and personal conflicts in multi-tenant residential buildings, resulting in resource-intensive conflict handling. By transferring governance to tenants with a review system and behavioural design, conflict escalation is minimised. Operational costs are reduced by data-based decision making and nudging tenants towards adoption of digital tools.



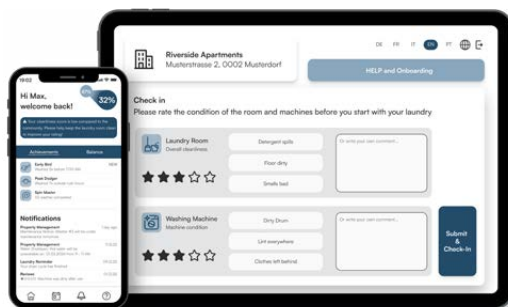
Dominik Hählen

Introduction and Objective

Switzerland combines a high tenant rate (54.2%) with a widespread prevalence of shared laundry facilities. While conflicts in shared laundry rooms primarily arise from social dimensions such as cleanliness, hygiene, and perceived fairness, most existing digital laundry management solutions focus mainly on transactional processes. This study examines the viability of new business development in digital shared laundry management and proposes a solution targeting an ideal customer segment. The enhanced value proposition aims to reduce operational burdens for property management and owners by shifting selected responsibilities toward tenants through structured self-governance mechanisms.

Method

I followed a qualitative research approach combining a literature review, stakeholder interviews, and prototype validation. Eleven semi-structured interviews with property managers, owners, and related stakeholders formed the basis for identifying key pain points. Based on these insights, the findings were synthesised into a set of solution features and implemented in a clickable mid-fidelity prototype consisting of a tenant-facing web application and a physical terminal. The concept was validated through seven validation sessions with key stakeholders to assess the proposed value propositions.



Prototyped Web App and Physical Terminal of Tenant Facing Interfaces

bfh.ch/ti/book

Results

Owners of multi-tenant buildings experience reduced asset lifecycles of shared laundry equipment, while property management faces time-consuming conflict handling and limited tenant adoption of digital processes, which reduces management efficiency. Fragmented responsibilities and fixed-fee management models result in low problem awareness and limited managerial involvement. Increasing anonymity and a low sense of responsibility among tenants further exacerbate these issues.

The proposed concept enables tenants to provide anonymous feedback to previous users via a physical terminal or web application, allowing frustration relief and behavioural reflection. Individual behaviour scores are contextualised within the community to guide tenant behaviour, while feature gatekeeping nudges tenants toward using the digital portal. A management dashboard aggregates feedback and satisfaction indicators, enabling efficient, data-driven decision-making. The concept was well received, and a major Swiss property management company expressed interest in testing the solution.

Implications and Recommendations

The study identifies potential yearly savings of CHF 567 per machine and 0.11 FTE per property manager. It is recommended to develop a minimum viable product incorporating identified improvements such as increased automation, enhanced tenant incentives, and full integration into existing property management software. Further development should include a detailed business case to specify the product's economic potential. Full software integration is particularly recommended, as it aligns with customer expectations and facilitates adoption. Co-development with the interested property management company is advised to secure an initial customer of substantial scale.



From scattered HR knowledge to structured profiles for transparent matching and better staffing

Degree programme : BSc in Industrial Engineering and Management Science

Specialisation : Business Engineering

Thesis advisor : Jeremy Henrichs

Expert : Dr. Ässia Boukhatmi

24

Swiss IT consulting SMEs often rely on scattered CVs, informal knowledge and manual coordination when preparing mini-tenders. This thesis designs and formatively evaluates a profile-first and reference-first MVP that structures employee profile and project-reference data as a basis for transparent staffing support.



Arrtan Klenja

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Introduction and Objective

In the investigated Swiss IT consulting SME, staffing knowledge was found across CVs, PDFs, Excel and informal memory. This matters because employee evidence like skills, certificates, languages, experience and availability is often assessed through weighted mini-tender criteria. As Figure 1 shows, the thesis addresses a practice-based gap: structuring fragmented employee profiles, references and informal staffing knowledge through a lightweight, reviewable and governance-aware MVP. The objective is to design and evaluate this MVP for mini-tender preparation. Profile-first means building structured employee data before AI matching. Reference-first means capturing past project work as reusable staffing evidence.

Research Design

Design Science Research was chosen to design, implement and evaluate an artifact in a real organizational context. Evidence included internal stakeholder and external expert input, an employee survey (n = 16), a company survey (n = 7), mini-tender documents and legal considerations. These sources were translated into requirements, design logic, MVP features and evaluation criteria. The MVP was developed through a specification-guided ChatGPT-Lovable prototyping loop. Evaluation feedback was documented, converted into findings and used for refinements.

Results

The main result is a lightweight, governance-aware staffing support MVP for mini-tender preparation. It enables guided onboarding, CV upload, employee profile maintenance, reusable project references and deterministic, rule-based fit support. The MVP does not automate staffing decisions or produce black-box rankings. AI is only used to extract and structure profile suggestions from uploaded documents, which must be reviewed before becoming trusted profile data. The fit support highlights fit, partial fit and missing evidence, showing that useful staffing support depends more on structured, reusable and reviewable employee profile data.

Implications and Recommendations

Practically, consulting SMEs should establish high-quality employee profile and reference data before investing in advanced AI matching. The study also contributes a profile-first and reference-first design logic that combines information quality, decision support, human-in-the-loop AI and data governance. The next step is a controlled pilot with real mini-tender cases, employee profile data and clear governance responsibilities. Future work should focus on profile maintenance, user adoption, production readiness and enhanced matching based on the structured data foundation.

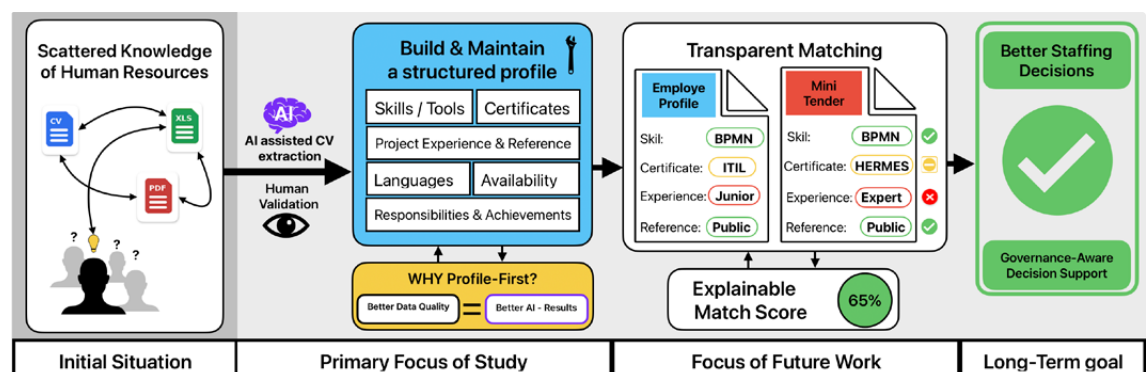


Figure 1: Transformation of scattered staffing knowledge into structured profiles and transparent staffing decision support

Conflict Minimization in Shared Laundry Rooms by a Digitally Implemented Fairness Logic

Degree programme : BSc in Industrial Engineering and Management Science
Specialisation : Business Engineering
Thesis advisor : Prof. Dr. Bastian Widenmayer
Expert : Jeremy Henrichs

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Shared laundry rooms lead to conflicts, limited flexibility and dissatisfaction among residents. Fixed schedules and insufficient transparency increase the organisational effort. The integration of user-friendliness and transparency, as well as gamification for fairness, shows the potential of a possible solution. With a revision of the developed prototype „LaundryHub“, the system can be used as a Minimum Viable Product (MVP) to demonstrate its economic viability.

Introduction and Objective

The aim of this bachelor's thesis is to investigate how a digitalized laundry room management system can address the challenges that cause conflicts and stress in shared laundry rooms. The study focuses on student residences as early adopters and examines how such a system can improve user-friendliness and transparency in the wash slot booking process.

Methods

The study follows a sequential qualitative approach. I conducted ten AI-generated semi-structured interviews and performed a qualitative content analysis to derive functional and emotional requirements. I translated the findings into a composite persona and created a clickable prototype as a mobile application („LaundryHub“). I then validated and refined the prototype in two rounds with three real users of shared laundry rooms.

Results

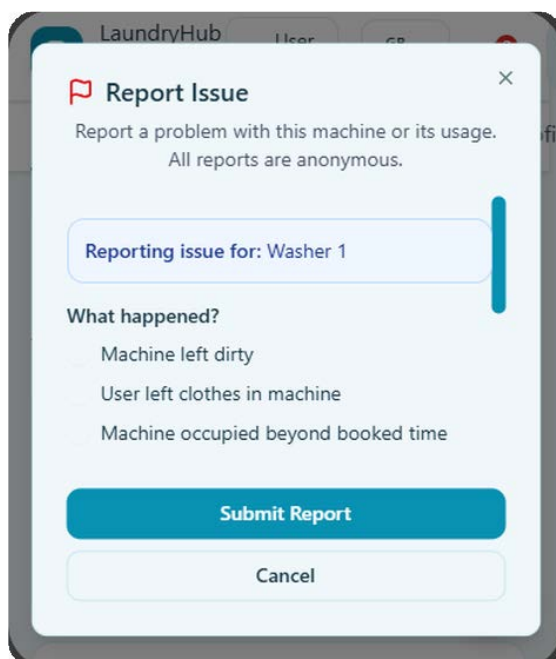
The results show that six out of eight assumptions about the solution potential from the AI-interviews correlated with real user needs. The users valued the real-time status of the machines, flexible slot booking, and notifications about start/end times and overdue pickups. These features reduce missed pickups, minimize potential conflicts, and support fair access. A subscription business model was rejected in self-managed environments, while pay-per-use is considered economically feasible with a slot price of CHF 0.50 per wash cycle.

Implications and Recommendations

The study shows that AI-supported user analyses provide valid assumptions in early development phases. It is essential that the assumptions are verified with real users. For early adopters, such as student residences, the app-only MVP requires no changes to the infrastructure or machines; instead, it charges CHF 0.50 per reserved wash slot, profitability depends on development costs and operating costs. To achieve further market readiness, the solution must be expanded to include a dongle that enables connection to existing infrastructure. This expansion allows for the precise allocation of washing machine usage to carry out complete billing for the washing process. Data collection opens the possibility of making this data available to machine manufacturers or third parties.



Simon Lehnerr



LaundryHub - Report Issue with Fairness Logic

Smart Grazing System: IoT-Powered Approach to Economic and Environmental Pasture Optimisation

Degree programme: BSc in Industrial Engineering and Management Science

Specialisation: Business Engineering

Thesis advisor: Patrik Marti

Expert: Adrian Stettler

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Based on a concrete use case, this thesis investigates whether pasture areas can be utilised more efficiently by reducing forage losses attributable to trampling damage, faecal contamination, and both over- and undergrazing. Building on this, a data-driven system for pasture optimisation is conceptualised. The study also examines the operational requirements, willingness to invest, and the economic and practical trade-offs associated with adopting such a system.



Jasmin Zoe Messerli

Introduction and Objectives

On investigated farms, trampling, faecal contamination and uneven grazing reduce the usable forage area and leave available herbage unutilised. Overgrazing can damage the sward and delay recovery, while undergrazing leaves surplus herbage standing or requires mechanical harvesting. As herbage growth and feed demand vary throughout the season, effective pasture management requires continuous planning and adjustment.

Research Design

The study applied a mixed-methods approach, combining qualitative and quantitative data collection. Expert interviews covered pasture management, animal welfare and virtual fencing. These were complemented by an interview with a farmer and observations conducted on a case-study farm. A survey with farmers examined pasture damage, openness to digital technologies and willingness to invest.

Results

The findings indicate that management decisions strongly influence pasture quality. Pasture damage can be reduced through appropriate grazing duration, rest periods, suitable pasture subdivision and alignment of forage supply with herd demand. Regular sward height measurements support decisions on pasture allocation and rotation timing. The interviews

also indicate that cattle can adapt to technical guidance systems when these are introduced gradually. However, animal welfare, safe access to water and the needs of cows and calves must remain central. Although farmers were generally open to digital technologies, only a few farms currently use digital or quantitative planning tools for simplification, and their willingness to invest in pasture optimisation remained limited. Existing inefficiencies were often viewed as normal operating conditions rather than as measurable economic losses, while simple, robust solutions were preferred over complex systems.

Implications and Recommendations

More efficient pasture use may improve forage utilisation, reduce purchased feed costs and limit soil and vegetation damage. However, implementation may also require additional planning, training, investment and reliance on technology. A simulation application was therefore developed as a digital twin of a grazing system to support pasture planning and optimisation. It illustrates the relationship between forage availability, pasture recovery and herd demand and allows different management scenarios to be compared. The findings also informed recommendations for the further development of a smart pasture management system combining digital decision support with an adaptable fencing concept.

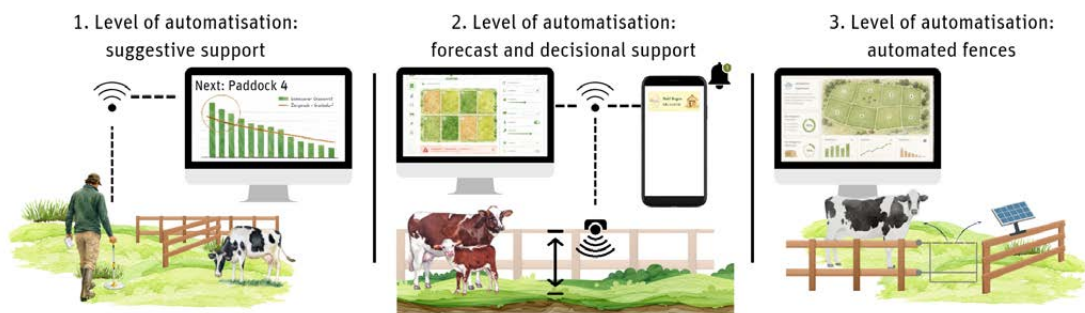


Figure 1: Three Levels of Automation in the Smart Grazing System

Design and Implementation of a Real-Time KPI Cockpit for Shipment Process Controlling

Degree programme : BSc in Industrial Engineering and Management Science

Specialisation : Business Engineering

Thesis advisor : Moritz Maier

Expert : Jeremy Henrichs

Industrial partner : Endress + Hauser Flowtec AG, Reinach

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Real-time KPI visibility is a key enabler of operational efficiency in manufacturing logistics. Yet many control processes still rely on manual order prioritization and limited shipment visibility. Endress+Hauser Flowtec AG is committed to data-driven operations and supports this project, in which a KPI cockpit MVP was designed, implemented and evaluated to validate whether real-time data can replace the manual shipment control process.

Introduction and Objectives

The shipping department DRXLE handles customer and division shipments without a standardized control process. Orders are prioritized manually, shipment status requires individual SAP queries and large pending deliveries stay invisible until packing slips are printed. The prestudy confirmed this structural deficit and produced a requirements specification covering eleven operational aspects and nine Key Performance Indicators (KPIs). The research validates whether a KPI cockpit can replace the existing manual control process based on existing ERP data and process logic.

Methods

The research combines Design Science Research with iterative product development. Five sprints resulted in a Minimum Viable Product (MVP) across versions V1 to V5. Two iteration workshops with the shift leader, an SAP specialist and operators informed the design cycles and validated artifacts.

The deployed MVP was evaluated through five qualitative interviews with operators and administrators plus a closing meeting with the team leader and shift leader, following the Customer Development framework. Validation was analyzed thematically rather than statistically, given the qualitative aim and the small number of operators.

As direct live SAP access was unavailable, data is exported via a VBA macro, loaded into Snowflake via a Python pipeline and visualized in Power BI using DirectQuery. A star schema with management KPIs pre-aggregated in Snowflake forms the final data model supporting management decision-making.

Results

Six of the nine KPIs were implemented: open orders, prioritization, on-time rate, backlog, storage capacity and Division assembly. Validation interviews and closing meetings confirmed requirement coverage and daily usability. The cockpit supports rather than replaces the manual prioritization but optimizes it, reduces pre-commissioning effort and improves transparency regarding the department's delivery performance. Due to the short evaluation period, long-term effects on company-wide on-time delivery performance could not be assessed.

Implications and Recommendations

Most Business Intelligence (BI) literature assumes governed, real-time data access. This thesis shows such access is often unavailable, yet a near-real-time cockpit can be built from existing ERP data. The contribution is a three-level KPI operationalization framework validated against SAP structures and a transferable architecture pattern for governance constrained BI. For a productive real-time cockpit, integration with SAP Datasphere is recommended to enable direct SAP data access.



Remo Straumann

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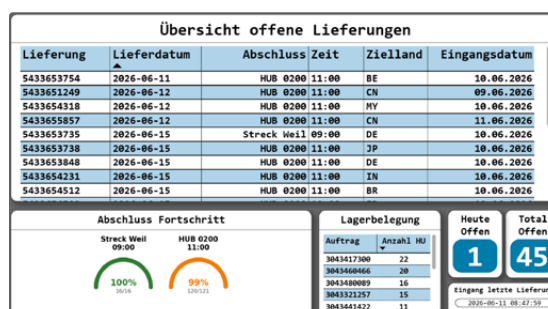


Figure 2: Customer shipping view of the KPI cockpit MVP

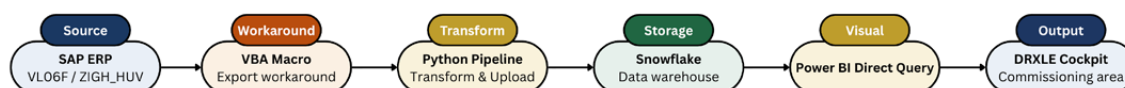


Figure 1: KPI cockpit data pipeline from SAP via Snowflake to Power BI

Variantenbasierte Entwicklung einer Produktionsstrategie für PackOnTime

Studiengang: BSc in Wirtschaftsingenieurwesen

Vertiefung: Business Engineering

Betreuer: Patrik Marti

Experte: Prof. Dr. Cédric Bessire

Industriepartner: Kern AG, Konolfingen

28

Diese Arbeit untersucht die zukünftige Produktions- und Montagestruktur der PackOnTime-Anlagen der Kern AG an den Standorten Schweiz und Deutschland. Auf Basis interner Unternehmensdaten, externer Faktoren und Experteneinschätzungen wurden die Varianten bewertet. Die Ergebnisse zeigen, dass eine hybride Variante den höchsten Gesamtnutzen bietet, da sie die Stärken der beiden Produktionsstandorte kombiniert.



Sven von Ballmoos

Einleitung und Zielsetzung

Die Kern AG muss die Produktions- und Montagestruktur der in Abbildung 1 dargestellten PackOnTime-Anlagen strategisch neu ausrichten. Aufgrund von Kapazitäts-, Kosten-, Qualitäts- und Standortfragen ist zu prüfen, ob zusätzliche Montageumfänge weiterhin im Mutterhaus Schweiz oder teilweise am Standort Deutschland erfolgen sollen. Ziel ist es, einen datenbasierten Variantenvergleich als Entscheidungsgrundlage für die zukünftige Produktionsstrategie zu erarbeiten.

Forschungsdesign

Die Arbeit wurde als Fallstudie mit qualitativen und quantitativen Methoden durchgeführt. Auf Basis von Literatur und Unternehmensdaten sowie Experteninterviews wurde ein Analyse- und Bewertungsrahmen entwickelt. Die Bewertung erfolgte mittels Nutzwertanalyse anhand wirtschaftlicher, strategischer und operativer Kriterien wie in Abbildung 2 zu sehen ist.

Ergebnisse

Die Analyse zeigt, dass weder die Montage im Mutterhaus noch eine Teilverlagerung nach Deutschland als Einzelvariante eindeutig überlegen ist. Deutschland bietet Vorteile hinsichtlich Montagekosten, Kapazitäten und der Nähe zum europäischen Markt. Der Standort Schweiz überzeugt hingegen durch bestehendes Know-how, die enge Anbindung an Entwicklung und Qualitätssicherung sowie eine hohe Flexibilität. Die Gesamtbewertung aus Nutzwertanalyse und Kos-

tenbetrachtung führt deshalb zur Ableitung einer hybriden Produktionsstruktur. Diese kombiniert die Stärken beider Standorte, reduziert Risiken eines einseitigen Ansatzes und erzielt den höchsten Gesamtnutzen für die zukünftige PackOnTime-Produktion.

Implikationen und Empfehlungen

Empfohlen wird eine hybride Produktions- und Montagestruktur. Die Schweiz übernimmt die Rolle als Kompetenz-, Integrations- und Flexibilitätszentrum für qualitätskritische und wissensintensive Tätigkeiten. Standardisierte und montageintensive Baugruppen werden schrittweise nach Deutschland verlagert. So lassen sich zusätzliche Kapazitäten und Kostenvorteile realisieren, ohne Schlüsselkompetenzen am Hauptstandort zu gefährden. Die Ergebnisse werden der Geschäftsleitung zur Entscheidungsfindung präsentiert, um eine langfristige und tragfähige Produktionsstruktur zu schaffen.

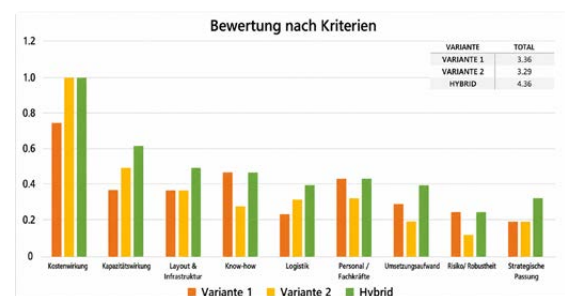


Abbildung 2: Bewertung der Varianten nach Kriterien



Abbildung 1: Multiformat Verpackungssystem, PackOnTime

Industrial Engineering

The Smart Screwdriver: Embedded Sensing and Transmission for Real-Time Assembly Verification

Degree programme : BSc in Industrial Engineering and Management Science
Specialisation : Industrial Engineering
Thesis advisor : Moritz Maier
Expert : Prof. Dr. Cédric Bessire
Industrial partner : PB Swiss Tools AG, Wasen im Emmental

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A manual torque screwdriver confirms when the target torque is reached, but not whether the correct parts were assembled. A missing gasket or wrong screw can therefore pass unnoticed. This thesis closes that gap: a compact gyroscope embedded in the screwdriver recovers rotation with single-digit-degree accuracy, flags assembly faults in real time, and transmits results wirelessly into industrial software, turning an analog hand tool into a digital quality gate.



Simon Aebl
aebl.simon@protonmail.com

Introduction and Objectives

Torque alone cannot detect missing components, wrong screw lengths, or jammed parts, and no manual torque screwdriver offers a second tightening parameter to identify them. Earlier projects identified the need for in-process quality assurance, process control, and traceability to prevent costly downstream defects. This thesis develops a wireless prototype that measures turn count, verifies assembly plausibility, and transmits results.

Research Design

The work followed seven iterative Design Science Research (DSR) steps, from customer interviews and market analysis in preceding projects through ground-truth measurement definition to an integrated wireless prototype. A micro-electromechanical systems (MEMS) gyroscope was selected as the only suitable principle for measuring the complete tool's rotation without an external reference. An optical-encoder testbench with 0.225° resolution provided ground truth, while a custom screw simulation station reproduced faulty assembly conditions. Development covered sensor selection, embedded electronics and firmware, experimental design, calibration, signal processing, middleware, and a user interface. The method was validated across speeds, orientations, operators, and disturbances, embedded in a screwdriver prototype, and tested in 239 trials, followed by a production-line evaluation with industrial partners.

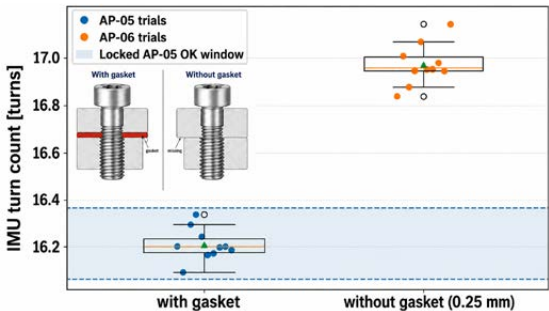


Figure 1: Turn-count distribution: correct assembly vs. omitted 0.25 mm gasket. No overlap; faults are rejected

Results

On the rigid bench, the gyroscope achieved a mean absolute error of 0.345° across 45 trials. In the integrated prototype, mean absolute error was 2.047° across 69 trials involving pauses, reversals, re-gripping, and tilt; the maximum was 7.6° under deliberate wobble. Across 80 paired trials and five fault classes, all anomalies were flagged and all correct assemblies accepted: 100% detection and zero false positives in the tested dataset. Even omission of a 0.25 mm sealing element produced a 0.77-turn separation (Figure 1). The on-device pipeline delivered a wireless verdict in about one second. A plug-and-play USB dongle and middleware enabled PC input, data export, and a pathway to downstream systems such as MES or QMS (Figure 2), completing the end-to-end implementation. Production-line evaluation confirmed relevance, with the system directly answering an unmet need in manual-tightening operations.

Implications and Recommendations

The results show that a single gyroscope can add turn-count plausibility verification to manual torque tightening without changing the basic task. For customers, this can help prevent defective assemblies from reaching later, more costly production stages. Pairing it with strain-gauge torque sensing could enable two-parameter verification and create a clear market differentiator for PB Swiss Tools in the manual torque segment.

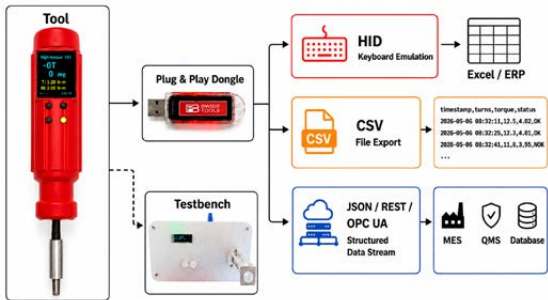


Figure 2: Simplified architecture: prototype tool, plug-and-play dongle, configurable middleware, ground-truth testbench

Automated Latte-Art Maker: Repeatable Latte-Art from a Software-Controlled Three-Axis System

Degree programme: BSc in Industrial Engineering and Management Science
Specialisation: Industrial Engineering
Thesis advisor: Moritz Maier
Expert: Matt Stark
Industrial partner: Berner Fachhochschule, Wirtschaftsingenieurwesen, Biel

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Latte-art has become a staple of specialty coffee, yet pouring it consistently demands skill, practice and experience. This thesis examines how a mechanically and software-controlled system can produce latte-art with measurable precision, repeatability and known limits. To explore this, a compact three-axis system was developed that dispenses foam and shapes it using a fine stylus.

Introduction and Objectives

Producing latte-art consistently is difficult, as the outcome depends on milk foam, pour dynamics and timing all at once. The work defines a mechanical architecture with sufficient degrees of freedom, finds the parameters driving pattern quality and repeatability, and targets several distinct patterns, the same pattern reproduced with minimal variation, and a full cup cycle under 60 seconds.

Research Design

The work follows a design-oriented engineering approach combining literature research, concept development and iterative testing. Three concepts were compared: classic pouring, etching with a stylus, and foam layering. Using a morphological analysis, weighted assessment matrix and risk assessment. Patterns were then refined iteratively, from rough tool-paths to clean designs. To locate where quality and repeatability break down, foam consistency, temperature and cup shape are varied one at a time and their effect on the outcome recorded.

Results

The result is a functional latte-art platform (Figure 2): a three-axis Cartesian gantry that moves a tool head in X, Y and Z relative to the cup, dispenses milk foam through a controllable valve, and sharpens the contours with a fine stylus. Every pattern is purely a software tool-path, so a new design needs only new code, no mechanical change.



Figure 1: A heart pattern produced by the system using real milk foam, defined entirely as a software tool-path

Three patterns, heart, star and flower, were produced and used to characterise the system (Figure 1). Repeatability was scored by photographing five samples of each pattern under fixed lighting and comparing them with perceptual hashing (pHash) and structural similarity (SSIM), combined with a 21-person survey, similarity reached 74.7% for the heart, 71.1% for the star and 68.6% for the flower, clearly indicating high similarity but differences in details and texture inconsistencies of the crema. The survey also rated a patterned coffee 8.76/10 for appeal.



Yannic Mike Mangold

Implications and Recommendations

The working resolution is a line width of roughly 5 mm and a corner radius of about 2.5 mm, the simpler patterns meet the 60 second cycle target (heart 59 s, star 57 s), while the most intricate exceeds it (flower 105 s). The system's edge is cost and size: built from parts totalling around CHF 300 on a modified consumer 3D printer, rather than a CHF 15'000–50'000 six-axis barista robot, it is compact enough to sit beside an espresso machine and adds new designs in software, not re-tooling. With the Swiss out-of-home coffee market worth around CHF 2 billion a year, such a unit could ship alongside specialty beans as a repeatable way to decorate premium coffee.



Figure 2: The automated latte-art maker, a three-axis gantry built using a modified 3D printer, with a foam-dispensing valve and a stylus tool positioned over the cup

From Farm to Cup: A Coffee Traceability Demonstrator for the BFH DVC Lab

Degree programme: BSc in Industrial Engineering and Management Science
Specialisation: Industrial Engineering
Thesis advisor: Moritz Maier
Expert: Prof. Dr. Stefan Grösser
Industrial partner: Berner Fachhochschule, Wirtschaftsingenieurwesen, Biel

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This thesis develops and evaluates a provenance-aware coffee traceability demonstrator for the BFH Digital Value Chain Lab (DVC Lab). Based on Digital Product Passport principles, it links a physical coffee bag to a digital product story and makes visible who contributes each data point and how it entered the system.



Michel Rindlisbacher

Introduction and Objective

The BFH DVC Lab roasts and packages its own coffee in a hands-on learning environment, yet upstream steps such as cultivation, export, and import remain invisible, and lab data sources are not connected into one coherent product story. The objective is to design a coffee traceability prototype that makes this extended value chain understandable in a lab context. Requirements were grounded in practice through exchange with specialty roasters and supply chain partners.

Research Design

The thesis follows a Design Science Research approach. Requirements derive from the DVC Lab setting, stakeholder input, and concepts in data models, traceability, and physical-digital interfaces. The prototype uses a lot-batch-product logic linking green coffee, roasting batches, and finished bags in one shared data model and public product story. Data enter through QR-based station logging, roasting and packaging records, live sensor and location input, simulated journey data, and upstream reference data. Each value carries one of three provenance classes: real, approximated, or simulated, so the data basis remains visible.

Results

The result is a provenance-aware demonstrator for coffee traceability based on one shared data model for lots, batches, and products. It connects five value chain stages through an NFC-tagged coffee bag, QR-based lab events, sensor and location input, login-based stakeholder views, a public product view, and an admin view. The core contribution is the provenance layer, which applies the distinction between real, approximated, and simulated data and shows how values entered the system. Real lab and partner data are combined with upstream reference and simulated context. Figure 1 shows how the value chain stages connect to the backend and user-facing views.

Implications and Recommendations

The thesis delivers a feasibility-tested prototype showing how physical access, event logging, sensor inputs, stakeholder views, and storytelling form one traceable system. Students and visitors gain a tangible understanding of the coffee value chain and how data provenance shapes trust. Lab operators and value chain actors see which data support credible transparency and where gaps remain. The provenance distinction makes these gaps explicit. Future work should expand real data capture and assess requirements for operational use.

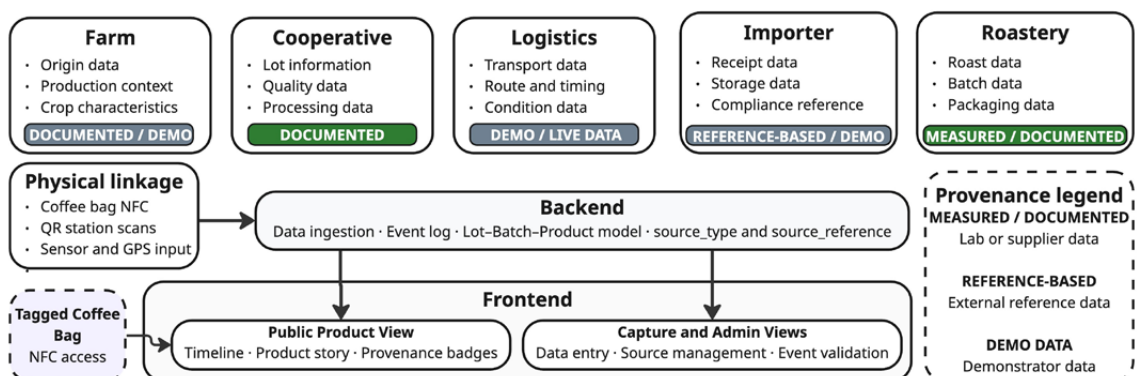


Figure 1: System architecture and data flows of the coffee traceability demonstrator

Techno-Economic Evaluation of Process Chains for Gypsum Recycling

Degree programme : BSc in Industrial Engineering and Management Science

Specialisation : Industrial Engineering

Thesis advisor : Prof. Dr. Maria Franco Mosquera

Expert : Prof. Dr. Stefan Grösser

Industrial partner : AA Protun AG, Oberdiessbach

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Every year, Switzerland recycles less than five percent of its 120'000 t of gypsum waste. 95% of it goes to landfill or incineration, although gypsum can be recycled in a closed loop. The goal of this thesis is to find an economical sorting process for regional sorting plants. Three process chain variants were designed and tested in a simulation. The results show which configuration offers the best balance between material recovery, cost, and environmental benefit.

Introduction and Objective

Gypsum can be recycled in a closed loop, yet in Switzerland about 115'000 tonnes go to landfill each year while only 5'500 tonnes return to the market. Landfilling gypsum is an environmental problem, because it releases sulphate into the leachate which is harmful. Also, the supply of gypsum will decrease by 45% until 2038 due to the shutdown of coal-fired power plants which produce gypsum as a byproduct. This makes recycling more attractive. Specialized recyclers need a high input purity that conventional sorting plants do not reach today. The objective of this thesis is to find a sorting process for regional sorting facilities in Switzerland that delivers clean gypsum fractions at a profit.

Research Design

The thesis builds on a preliminary study, which characterized the input material (figure 1), the quality requirements of the recyclers, and technologies for separation. On this basis, three process variants were designed through material flow analysis and validated through sensitivity analysis. Variant A combines pre-sorting, crushing, and sensor-based sorting for the highest purity. B uses rough pre-sorting, crushing, and sorting for lower investment. C uses sorting only,

for the lowest investment. Each variant was modelled as a simulation, where the mass balance and KPIs were calculated. These KPIs were then compared from a techno-economic perspective.

Results

Crushing turned out to be the decisive step. Without it, most of the gypsum stays in a contaminated state that can only be incinerated. Variant C therefore cannot be operated at a profit. Variant B reached a 60% shorter payback period than Variant A, although it recovers less gypsum. Under the current gate fees, recovering more gypsum than necessary from the landfill fraction costs 50 CHF / t, which makes a complete recovery economically unattractive.

Implications and Recommendations

Under today's gate fees, a process with crushing and moderate sorting offers the best balance for a regional facility (figure 2). A more thorough process only pays off if recovery is rewarded by regulation or by higher gate fees. Three recommendations follow: Facility operators should pool material in a consortium (a single facility reaches only ~20% of achievable utilisation and can't profit alone) and start with a Variant B-style plant, expanding toward Variant A as conditions allow. Lawmakers, meanwhile, should enforce the existing separation obligation and support the gate fee structure so that material recovery becomes the rational choice rather than a voluntary one.



Lorenz Rügsegger



Figure 1: Assessed input material

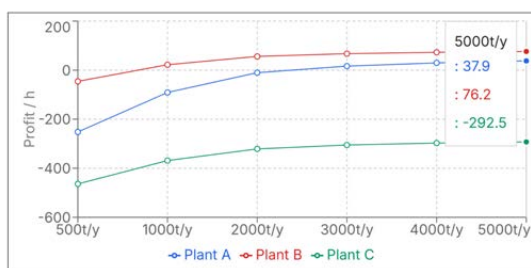


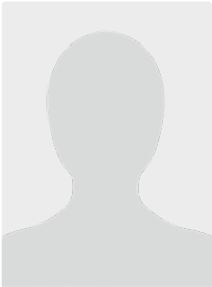
Figure 2: Calculated profitability of each process variant at different annual input material throughputs

Slicer-Agnostic ML Post-Processing to Bricklayer G-Code for sturdier FDM 3D Prints

Degree programme : BSc in Industrial Engineering and Management Science
Specialisation : Industrial Engineering
Thesis advisor : Patrik Marti
Expert : Prof. Dr. Cédric Bessire
Industrial partner : 3D Print Core Facility University of Basel, Allschwil

34

Conventional FDM slicing yields anisotropic properties, with Z-direction strength reduced by weak interlayer adhesion and porosity. Bricklayer G-Code can mitigate this through non-planarity by offsetting every other print line by half a layer height. This slicer-agnostic Python script uses semantic segmentation through a U-Net-based classifier operating on rasterized toolpaths to identify extrusion features and enable offset application across proprietary slicers.



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Objective

There is currently no commercially available solution to apply bricklayers in a fully slicer agnostic manner, which is important when printers rely on proprietary slicing ecosystems as in medical 3D printing. Existing rule based post processors reconstruct geometric shapes from raw G-code to decide where to apply an offset, an approach that is computationally expensive, hard to generalize, and requires regular maintenance when slicers are updated. In contrast, this project aims to apply a machine learning based classifier that focuses on extrusion behavior rather than textual syntax to achieve more robust feature detection across diverse G-code sources.

Method

At the core is a Python script that parses arbitrary slicer G-code into a uniform tabular representation by tracking absolute/relative XYZ/E positions line-by-line, groups extrusion moves into geometric shapes based on endpoint continuity, and regenerates a modified file. For each layer, shapes are rendered as SVG paths, rasterized into pixel arrays with color-coded labels from slicer-specific comments, and normalized to remove positioning artifacts so that downstream components operate on a consistent geometric view. A U-Net-based convolutional neural network for semantic segmentation, implemented in TensorFlow with pixel-accuracy and mean intersection over union as metrics, classifies each pixel into feature classes which are mapped back to shapes and G-code lines. During prediction, the network processes binary raster layers of arbitrary size, majority voting over the pixel-wise predictions then assigns feature labels

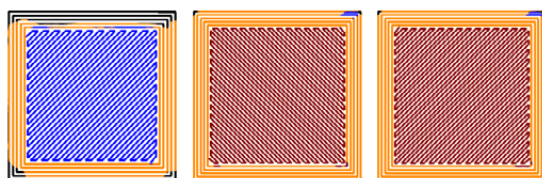
such as wall, infill, surface or other to each shape and drives a rule-based bricklayer algorithm that determines which line groups may be offset while preserving dimensional accuracy and printability. Alternating line groups receive a half-layer-height Z-offset constrained by coverage relationships between neighboring layer; only Z coordinates and, where configured, extrusion multipliers are modified, while XY paths, feed rates and command types remain unchanged, and an additional reordering step ensures a collision-free sequence from lower to higher Z levels. The model was trained on automatically labeled datasets spanning common extrusion features across slicers, yielding high accuracy and promising mIoU on validation despite class imbalances. Training used a U-Net encoder-decoder architecture with skip connections for precise boundary detection. The workflow is packaged as a standalone executable with a graphical frontend that allows users to load G-code files and configure parameters such as offset strategy and extrusion multiplier.

Results

The results show a slicer-agnostic post-processor reliably applies bricklayer offsets without disrupting proprietary slicer ecosystems, ideal for proprietary systems. ML classification cuts maintenance versus rule-based heuristics, as retraining adapts to new slicers. Limitations include complexity of model geometry and minor material and print time increases imply low overhead.

Implications

This proves ML-based feature detection suits bricklayer post-processing, meriting further development for deployment in clinical and industrial applications by expanding ML training with larger 3d model data sets with higher variability and complexity.



U-Net semantic segmentation pixel prediction (orange = wall, red = infill, blue = surface, black = other)

Profit-Oriented Scheduling of Residential Photovoltaic Energy Systems

Degree programme : BSc in Industrial Engineering and Management Science

Specialisation : Industrial Engineering

Thesis advisor : Patrik Marti

Expert : Prof. Dr. Niki Zumbrennen

Industrial partner : PRiOT AG, Burgdorf

35

To better align solar power generation with household power consumption, Swiss electricity tariffs are turning dynamic. Standard residential energy management systems (EMS) rely on reactive, price-blind self-consumption logic and cannot exploit the resulting intra-day price spreads. Together with PRiOT AG, this thesis extends such an EMS with a new profit-oriented optimization logic that maximizes the daily profit from photovoltaic systems under dynamic electricity pricing.

Introduction and Objectives

Today's EMS follow a self-consumption optimization logic: by reacting to current measurements, they control household loads to use as much locally generated solar energy as possible. Under new dynamic Swiss electricity tariffs, prices change every fifteen minutes, and a purely reactive controller can no longer recognize when energy is most valuable. The objective of this thesis is to develop a profit-oriented scheduling logic for an EMS that maximizes the daily profit of photovoltaic systems under dynamic pricing.

Research Design

Following a design-science approach, this thesis develops a profit-oriented EMS prototype and evaluates it through simulation-based comparative testing of self-consumption versus profit-oriented control on norm-day scenarios, with the realized daily profit as the primary evaluation metric.

Results

A Python-based profit-oriented optimizer was built that produces an ideal schedule for a household's controllable loads. The optimizer was integrated into PRiOT's EMS, thereby yielding a first complete profit-oriented EMS prototype. Simulation-based testing

shows that, while the current self-consumption logic often results in a negative daily profit under dynamic pricing, the new profit-oriented scheduling achieves a positive daily profit under the same conditions.

Implications and Recommendations

The prototype's performance could be further increased by improving the forecasts of household consumption and PV power generation. In addition, a rolling-horizon approach could be implemented to continuously update the schedule based on live data. Nevertheless, the prototype already provides a solid basis for a production-ready profit-oriented EMS, enabling PV-owning households to capture more value from dynamic pricing.



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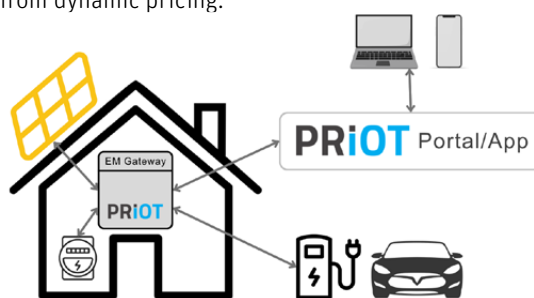


Figure 1: PRiOT Energy Management System (EMS) ecosystem

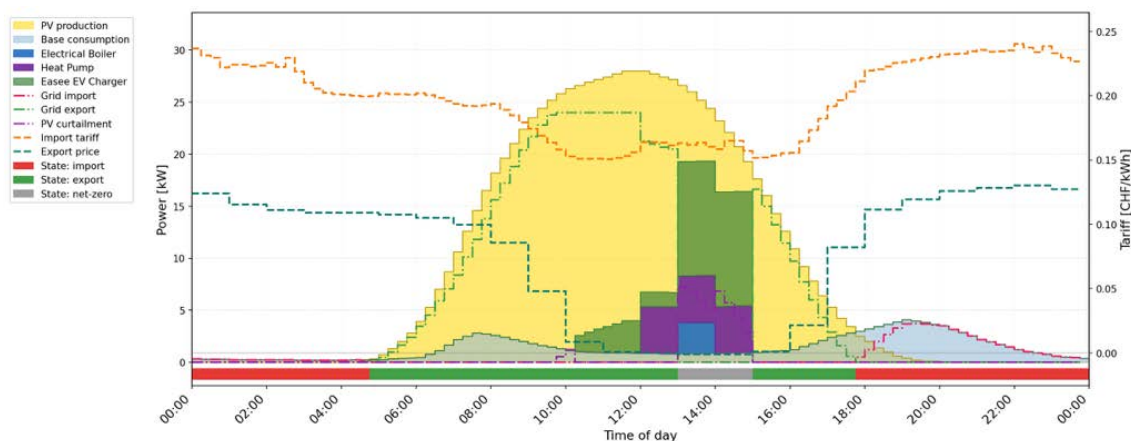


Figure 2: Day-ahead schedule of the profit-oriented optimizer

Supply Chain and Process Engineering

Digital Process Excellence Checkup: Development of a Maturity Assessment Instrument

Degree programme: BSc in Industrial Engineering and Management Science
Specialisation: Supply Chain and Process Engineering
Thesis advisor: Moritz Maier
Expert: Prof. Dr. Stefan Grösser
Industrial partner: SwissICT, Zürich

37

Many Swiss organisations struggle to assess how mature they are in process digitalisation and automation. Existing maturity models are either too generic, sector-specific or weakly validated. This project develops the Digital Process Excellence Checkup, a scientifically grounded assessment instrument that helps organisations measure their capabilities and derive concrete improvement priorities.

Introduction and Objectives

SwissICT offers a family of maturity assessment tools, used by hundreds of Swiss organisations since 2020. However, they do not cover process digitalisation and automation in enough depth. The goal is to develop the Digital Process Excellence Checkup, an assessment instrument that lets organisations evaluate how mature their business processes are in digitalisation and automation. The instrument must be usable across sectors and fit the existing checkup family.

Research Design

First, a literature review was conducted to examine various maturity model streams. Recurring dimensions were identified and compared across existing models. These findings were synthesised into a dimension framework. The framework was validated and refined through expert interviews. Based on the validated dimensions, indicators and an evaluation scheme were defined. A questionnaire-based assessment instrument was then designed, reviewed with experts, and tested in a pre-test. The results were analysed and improvements for the checkup were derived.

Results

The synthesis produced a process-centric framework with 6 dimensions that integrates maturity models from business process management, digital transformation and process automation. The framework was operationalised into a structured assessment tool with defined indicators and an evaluation scheme. The pre-test with 21 participants showed an overall process maturity of 1.37 on a 0–3 scale. The largest need for action was in D2: process transparency and D3: process digitalisation & automation.



Martina Nathalie Widmer

Implications and Recommendations

The checkup gives Swiss organisations a transparent view of their digital process excellence and helps them set improvement priorities. It is designed as an easy to use online self-assessment for managers and staff with process knowledge and can be repeatedly applied to track progress over time. SwissICT can add the instrument to its portfolio and related offerings. Future work should collect a larger sample to enable benchmarking between organisations.

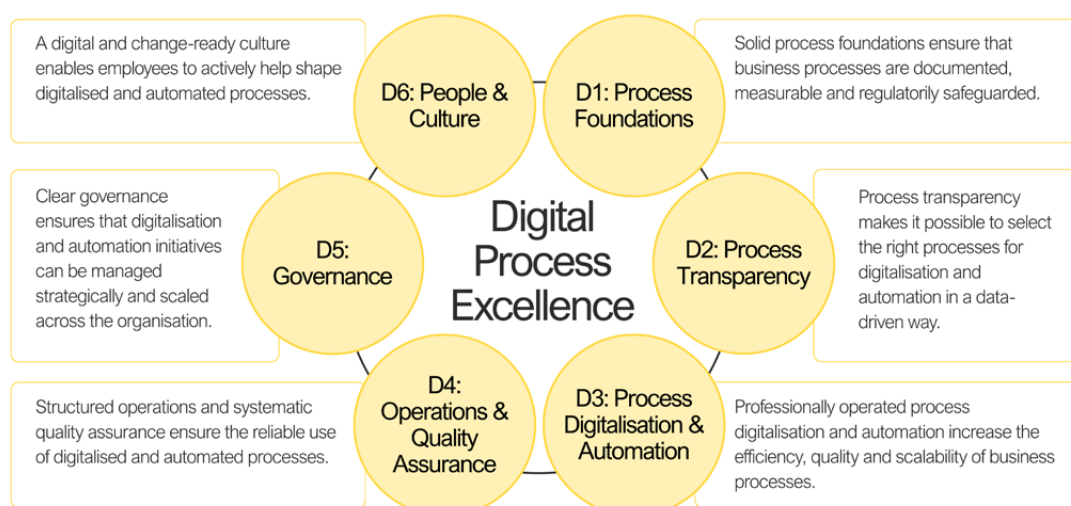


Figure 1: Dimensions of the Digital Process Excellence Checkup

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