



**PROJECT
HALF
DOUBLE**

Project Half Double

ADDENDUM:
CURRENT RESULTS FOR PHASE 1, JANUARY 2017

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INTRODUCTION

The Half Double mission: Project Half Double has a clear mission. We want to succeed in finding a project methodology that can increase the success rate of our projects while increasing the development speed of new products and services. We are convinced that by doing so we can strengthen the competitiveness of Denmark and play an important role in the battle for jobs and future welfare.

The overall goal is to deliver *“Projects in half the time with double the impact”* where projects in half the time should be understood as half the time to impact (benefit realization, effect is achieved) and not as half the time for project execution.

The Half Double project journey: It all began in May 2013 when we asked ourselves: How do we create a new and radical project paradigm that can create successful projects? Today we are a movement of hundreds of passionate project people, and it grows larger by the day.

The formal part of Project Half Double was initiated in June 2015; it is divided into two phases where phase 1 took place from June 2015 to June 2016 with seven pilot projects, and phase 2 is in progress from July 2016 to July 2017 with 10 pilot projects.

The Half Double consortium: Implement Consulting Group is leading the project as well as establishing and managing the collaboration with the pilot project companies in terms of methodology. Aarhus University and the Technical University of Denmark will evaluate the impact of the pilot projects and legitimize the methodology in academia.

The Danish Industry Foundation, an independent philanthropic foundation, is contributing to the project financially with DKK 13.8 million.

About the addendum: We published the report “Preliminary results for phase 1” in June 2016 (Svejvig, Ehlers et al. 2016). It is time to follow up on the Phase 1 pilot projects and to document their development.

The purpose of this addendum is thus to document the development in the pilot projects from June 2016 to January 2017 with particular focus on the impact they have created.

This Addendum is a supplement and should be read in conjunction with the Phase 1 report, which will give the reader relevant further information.

The target group for this report is practitioners in Danish industry and society in general.

The report was prepared by a responsible editorial team from Aarhus University.

The addendum was prepared from December 2016 to January 2017, which means that late data about pilot projects from January 2017 is not included in this report.

The report is structured as follows: The next chapter presents an overview of the current results from Project Half Double as of January 2017. This is followed by seven chapters, each covering details on current results from the pilot projects. The report ends with a conclusion.

Appendices include a description of the research methodology as well as limitations with regard to the findings and conclusions of this report.

OVERVIEW OF CURRENT PILOT PROJECT RESULTS

Phase 1 of Project Half Double consists of seven pilot projects and the overall time line for these projects is shown in FIGURE 1 below.

FIGURE 1: Overview of pilot projects

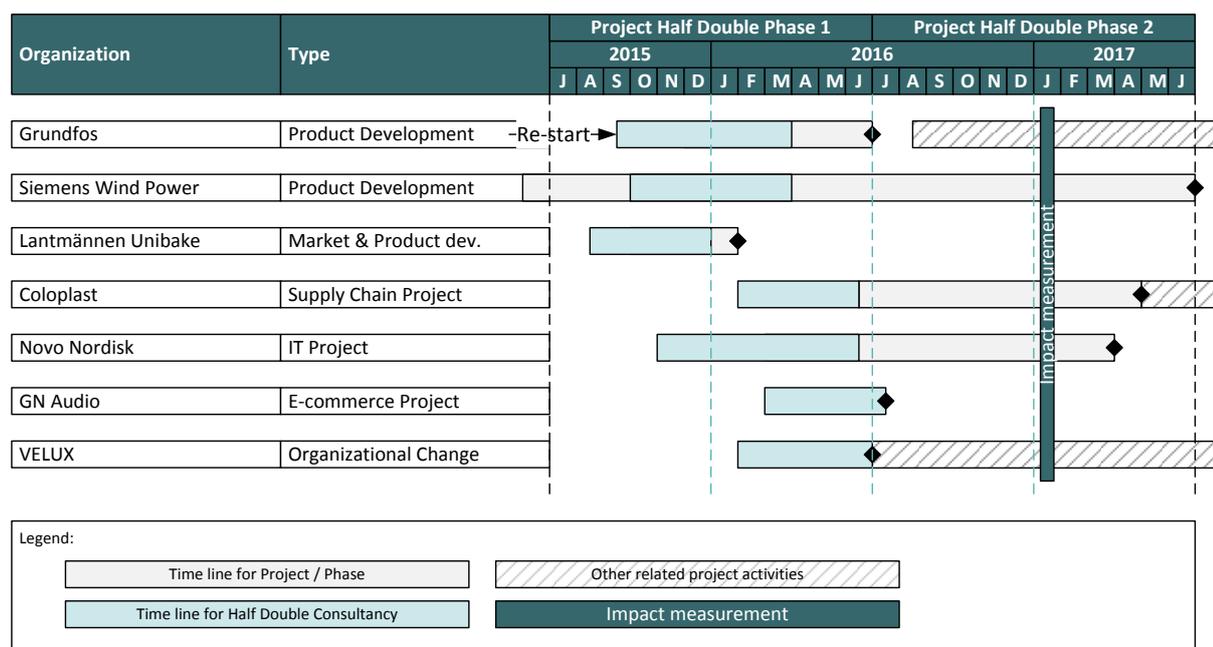


FIGURE 1 shows the time lines for each pilot project. The light green bars indicate the period where Half Double consultants from the Implement Consulting Group have supported the projects. The shaded grey bars indicate that pilot project results are used in other projects. Finally the dark green bars shows the impact measurement, which is done as part of preparing this addendum and makes up the core of the current results presented here.

Current results with respect to impact from Half Double Methodology: An overview of the current results of the pilot projects are shown in FIGURE 2, next page:

- The Lantmännen Unibake, Novo Nordisk, GN Audio and VELUX pilot projects appear to have benefitted from using the Half Double Methodology
- Grundfos and Siemens Wind Power pilot projects seem to have had little effect of using the Half Double Methodology
- The Coloplast pilot project is still running, so we cannot yet comment on the potential effect from the Half Double Methodology
- All the pilot projects have produced much learning beyond the more specific effect evaluated

FIGURE 2: Impact from Half Double Methodology on Pilot Projects

COMPANY	PROJECT TYPE	IMPACT FROM HALF DOUBLE METHODOLOGY
 GRUNDFOS	Product Development	○
 SIEMENS	Product Development	○
 Lantmännen Unibake	Market & Product Development	●
 Coloplast	Supply Chain Project	◌
 novo nordisk	IT Project	●
 GNI	E-commerce Project	●
 VELUX	Organizational Change	●

● Higher
○ Lower
◌ N/A

Research methodology: The research process focused on evaluating the pilot projects mainly as regards the impact (value, benefit, effect) and the practices applied (e.g. Half Double Methodology), but also mapping of more classical project data such as duration, cost and resources. Impact can be divided into short-term impact, medium-term impact and long-term impact, where short-term impact can be evaluated shortly after completion of a project or a phase depending on the kind of impact, while medium-term and long-term impact might only be evaluated after several years.

Evaluation in the individual organization consists of the pilot project and three reference projects, which are used for comparison. The basic idea of the comparison is to evaluate in practical terms to which extent the pilot project performs better (or worse) than the reference projects (see Appendix A for a more elaborate description and Svejvig and Hedegaard (2016)).

The focus in this addendum is on evaluating the impact and fulfillment of success criteria. Five out of seven pilot projects are completed or nearly

completed, which enables us to consider at least the short-term impact for many of the projects documented in pilot project chapters. Please refer to Appendix A for a more comprehensive description of the research methodology.

Limitations: There are several limitations to the results presented in this addendum: general limitations applying to all pilot projects and specific limitations related to a given pilot project. Please refer to Appendix B for a detailed presentation of limitations identified in this study, which are important for interpretation of the results.

Contents of pilot project chapters:

- Brief description of the company in order to give high level contextual information
- Pilot project outline including time line
- Success criteria for the pilot project and status of fulfillment
- Comparison of pilot project with reference projects including a discussion of whether the pilot project performs better (or worse)

GRUNDFOS PILOT PROJECT

Company and Pilot Project

Grundfos, which is based in Denmark, is the world's largest pump manufacturer. The annual production amounts to more than 16 million pump units, circulator pumps (UP), submersible pumps (SP), and multi-stage pressurizing pumps (CR) as the main product groups. Grundfos also produces electric motors for the pumps as well as electric motors for separate merchandising. Grundfos develops and sells electronics for controls for pumps and other systems.

Key figures:

- More than 18,000 employees worldwide
- Turnover in 2014: EUR 3,168 million.

In 2012, Grundfos established a project model for frontloading projects consisting of three stages after ideation: Initiate, create and mature. Frontloading projects is used as a way to accelerate knowledge and do away with major uncertainties prior to product development. The tangible output from frontloading projects is a so-called "Fact Pack", i.e. documentation with the following content: business evaluation, innovation

profile, design ambition, product family master plan, technical documentation (design journals) and transition readiness assessment. The fact pack is used as input to and foundation for the Product Development Project (PDP), which will be carried through following the frontloading project.

The pilot project is a frontloading project; it was initiated to safeguard an increased market share whilst maintaining its leading position as world-class pump manufacturer. This is expected through the development of a robust concept which not only needs to be technically feasible but also have the projected attractiveness and impact for Grundfos' customer segments. The overall aim of the pilot project is to reduce time to market in the research and development process.

The frontloading phase is terminated and the project is transferred to product development under a new project manager.

TABLE 1 shows a brief overview of the project's key activities.

TABLE 1: Brief overview of the pilot project's key activities

TIMING	DESCRIPTION
August 2015	Initial meeting with sponsor. Designing and defining the impact case.
September 2015	Kick off with core team. Building the colocated project room. Establishing the project rhythm.
October 2015	Finalization of first sprint. Pulse checks. Impact tracking established with KPI's.
November 2015	First pulse check assessed. Customer feedback workshops. Sub-teams and key stakeholders presented to plans and semi products.
December 2015	Pulse check assessed and team evaluation performed.
January 2016	Preparation of customer meetings with commercial team. Presentation to Niels Due Jensen.
February 2016	1-day reboot workshop with focus on re-planning the project and the milestone plan.
March 2016	Customer workshops conducted in various markets to verify impact map.
April 2016	Project continues without PHD consultants.

TIMING	DESCRIPTION
June 2016	G3 passed and frontloading terminated. Project transferred to product development.
August 2016	Decision to postpone DP1 (end of idea phase).
Q1 2017 (expected)	The project is expected to pass Gate DP1.
Q3 2017 (expected)	The project is expected to pass Gate DP3 (end of concept phase).

Table 2 shows the key success criteria and their fulfillment as of early January 2017.

TABLE 2: Overall success criteria and their fulfillment

SUCCESS CRITERIA		
	Target	Actual / Expected
#1	Obtaining an internal rate of return (IRR) >= 14%.	No changes. To be evaluated after product launch.
#2	Product should replace 90% of current pumps in the same series.	No changes. To be evaluated after product launch.
#3	Standard unit cost below a certain number with specific technical data.	To be evaluated after product launch.
#4	Reduce number of product variants by 50% without increasing number of platforms.	To be evaluated after product launch.
#5	Sales doubled within 5 years and a market share of 20%.	This criterion was questioned in August 2016 and is expected to be changed.
#6	Shorter time to market for pilot project reducing the frontloading phase from Gate 2 to Gate 3 from nine to six months.	Lead time was nine months although the project was able to finalize the phase in April 2016 – seven months after G2. Yet, from a portfolio management perspective, it was decided to postpone the project deadline to June 2016.
#7	The first three phases of the product development project are completed within six months (from development project gate DP0 to DP3 covering idea, pre-study and concept phases).	Not fulfilled. At the DP1 meeting, success criterion #5 was questioned. The project was curbed from August 2016 until Q1 2017 due to these changes and further investigations. DP3 is now expected in Q3 2017.
#8	Pulse check shows satisfaction among key stakeholders on a score of 4.4	Not fulfilled. Average rating differs between 3.5 and 4.0 from October 2015 (4.0) to January 2016 (3.5) to April 2016 (3.9).
#9	“Transition Readiness Assessment” (TRA) should reach a target of 90% after mature phase.	Almost fulfilled. The pilot project has gone from 63% at the beginning of the mature phase to 86% at the end of mature phase.

Comparing Pilot Project with Reference Projects

At present, no impact effect of the Half Double Methodology in the pilot project can be documented, when comparing to the reference projects. However, Grundfos has gained important and useful insights from participating in Project Half Double.

Even though the frontloading phase of the pilot project ran smoothly and could be terminated ahead of schedule, lead time still depended on the next step in the development process being allocated and ready to take over. Moreover, outside contingencies and management decisions resulted in a further delay. The project is expected to pass the first gate in the product

development process in Q1 2017. Consequently, Project Half Double has not reduced the time to impact or impacted on the overall Grundfos business.

Still, Half Double practices such as the pulse check, visual planning and colocation were reported to work well and to contribute beneficially to running the pilot project. Therefore, they will now be employed in other Grundfos projects. At a later time, when the pilot project passes the third gate in the product development process (expected in Q3 2017), it will be possible to compare the project to the reference projects again to gain an overall view of similarities and differences across the four projects.

SIEMENS WIND POWER PILOT PROJECT

Company and Pilot Project

Siemens Wind Power is a world-leading supplier of high-quality wind turbines and related services, ranked number one in the global offshore market. With robust, reliable wind turbines and highly efficient solutions for power transmission and distribution, Siemens provides clean power across the entire energy conversion chain.

Key figures:

- Approximately 7,000 employees around the world
- Total revenue of DKK 22,827 million

From the main Siemens Wind Power development centre in Brande, Denmark, and locations around the world, employees are helping to meet tomorrow's energy needs while protecting the environment. World-class engineering and state-of-the-art technology are the drivers behind Siemens' innovation power. Drawing on 160 years of experience and nearly 30 years as a major innovation driver in the wind power industry, Siemens has proven itself a trustworthy and reliable business partner. With high performance and excellent as well as innovative solutions, Siemens Wind Power generates clean power for the future and aims to

be among the top three wind turbine suppliers globally.

Siemens AG is a global powerhouse in electronics and electrical engineering, operating in the industry, energy, and healthcare sectors, and employing more than 400,000 people worldwide. Siemens Wind Power is a business unit in the Energy sector of Siemens AG.

The pilot project is characterized as a product development project. It was initiated in 2014 with the purpose of introducing an innovative onshore wind turbine able to produce 19% more energy compared to earlier models. The project is a must-win battle for the company, which results in an extreme focus on "time to market" and "product cost" as well as on reaching the ambition of breakeven target in only a few years. However, being a large, highly technical project with over 150 project staff members spread across 36 different work areas, complexity naturally presents a challenge in relation to meeting critical development deadlines. And for every potential month the project could be delayed, revenue would be severely decreased as the wind turbine market is based on "windows of opportunity" within fixed timeframes.

TABLE 3 shows a brief overview of the project's key activities.

TABLE 3: Brief overview of the pilot project's key activities

TIMING	DESCRIPTION
August 2015	Pilot project initiation.
September 2015	Designing and defining the impact case and introducing pulse checks.
October 2015	Mapping high impact deliverables. Workshop 1 to operationalize a new project organization and fixed project rhythm.
November 2015	Workshops 2 and 3 on accelerated production of selected high-impact deliverables.

TIMING	DESCRIPTION
December 2015	Colocation planned and prepared.
January 2016	Colocation kick off. Pulse Check reboot.
February 2016	External PHD review meeting.
March 2016	The pilot project continues without PHD consultants.
August 2016	0 series production started.
October 2016	Milestone M 3.2.F release of 0 series Bill of Materials (BoM).
December 2016	0 series production completed.
January 2017	Gate 3 - 0 series development.
February 2017 (expected)	Milestone M 4.3. Release of BoM for serial production.
April 2017 (expected)	Gate 4 – Release for serial production and sales.
July 2017 (expected)	Gate 5 – Product handover.

TABLE 4 shows the key success criteria and their fulfillment as of early January 2017.

TABLE 4: Overall success criteria and their fulfillment

SUCCESS CRITERIA		
	Target	Actual / Expected
#1	Breakeven in x years (from 0-series in 2016 to up scaled production in 20xx).	Expectations unchanged. To be <i>evaluated after</i> product launch Gate4.
#2	Create a revenue stream for SWT 3.3-130 of €Xm 2016, €Xm in 2017 and €Xm in 2018.	Expectations unchanged. To be <i>evaluated after</i> product launch Gate4.
#3	Impact: Time to market retained for Gate4. A delay of more than six months will have severe negative business impact.	The forecast of keeping time to market is good. Even though Gate4 is delayed, the commercial impact is unaffected.
#4	Flow: Reduce time to impact in the “design and prototyping” phase (from milestone M3.3.1 to milestone M3.2F).	Milestone M3.2F was formally passed in October 2016. A four-month delay according to the original plan. This delay did not impact the 0-series production, which started in August 2017 and ended as planned in December 2017. The delay of formal Gates and Milestones has not had any impact on the general flow.
#5	Leadership: Key stakeholder satisfaction rated 3.5 in impact creation (on a 1-4 scale).	The monthly pulse check varied from 2.6 to 3.4 and is therefore lower than target. From October 2016, pulse checks were no longer carried out.

Comparing Pilot Project with Reference Projects

This project has seen several delays and pushbacks. Therefore, it is not characterized as an

immediate success in the company. However, due to market contingencies, these delays do not have any serious commercial impact. The project has continuously kept focus on continuous value

creation and on maintaining the flow in the project. This means that even though the passing of formal milestones and gates has been delayed, the production of the 0-series was not affected. This practice of keeping flow in the project even though the formal gates are postponed, is practiced in the reference projects as well. In this case, it is therefore not possible to document any impact effect of the Half Double Methodology and a reduced time to impact in the pilot project, when compared to the reference projects.

The Siemens Wind Power pilot project is an extensive, highly technical and complex project with a large number of participants across various work areas and divisions. Introducing the Half Double methodology and the focus on impact faster in only one part of the project may not be sufficient, due to the dependency on deliveries from the many sub-projects. For the Half Double

Methodology to have any effect therefore requires a broader anchoring and support in the governance structure and on a wider management level.

Additionally, this project did not establish an impact case when it was initiated in 2014. The Half Double Methodology was introduced in the “design and prototype phase” between milestone M3.3.1 (August 2015) and milestone M3.2F (set for March 2016, but later postponed until October 2016). This means, that the project had already passed Gate2 (release for design and conditional sales), an important gate where the project was locked towards Gate4 (release for serial production and unconditional sales). Projects of this size cannot easily be changed this late in the process. This suggests that in this case, the Half Double Methodology was introduced too late in the project to have any overall effect.

LANTMÄNNEN UNIBAKE PILOT PROJECT

Company and Pilot Project

Lantmännen Unibake (LU) is one of Europe's leading suppliers of high quality bakery products to retailers, wholesalers and the foodservice industry; Lantmännen Unibake has 35 bakeries in 21 countries.

Key figures:

- Approx. 6,000 employees and net sales about EUR 1,1bn
- Head offices: Horsens & Copenhagen, Denmark
- Part of Lantmännen

LU is owned by Swedish farmers through the Lantmännen Group; it has a strong commitment to long-term responsibility from field to fork. LU offers a wide range of solutions for both professional customers (B2B) and consumers (B2C). LU's aim is to make bread a profitable business for its customers and serve consumer needs through high-quality products and superior solutions – always based on a sustainable mindset and excellent food safety standards.

The pilot project is categorized as a commercial concept development project. LU was approached by one of its store customers and tasked with developing an entirely new concept, viz. a range of bread and pastries for a new in-store concept to be launched in spring 2016. The position of new concept was meant to contest

the customer's main competitors (other stores), while at the same time not replacing the existing product range already supplied to the customer, but serving as a novel concept appealing to consumers.

The project's main purpose revolved around creating a new business model adding value for the parties involved by 1) developing a new in-store concept including defining a range of products and new packaging; and 2) building closer relations with the customer.

These purposes combined were meant to result in LU's project vision of becoming its customer's preferred supplier within this specific type of concept.

The project was kicked off in August 2015 and the total length of the project was estimated at approximately seven months, which meant a significant reduction of the lead time, compared to the average project lead time, which was about 12-14 months. In December 2015, after four and a half months, the steering committee decided to terminate the initiative organized as a project and continue the implementation of the new concept in an operational setup headed by the previous project owner. In January 2016 the first launch was actualized - sales are generated six months after the project started.

key activities.

TABLE 5 shows a brief overview of the project's

TABLE 5: Brief overview of the pilot project's key activities

TIMING	DESCRIPTION
August 2015	Kick off, project vision, purpose, success criteria and deliverables plus milestone plan and analysis.
September 2015	Impact case, KPI definition, first sprint, team pulse check, solution feedback review with

TIMING	DESCRIPTION
	customer.
October 2015	Introducing and onboarding LU's reference group and steering committee to the PHD.
November 2015	Evaluation of pilot project with project team.
December 2015	End of pilot project.
January 2016	First launch and sales generation.

TABLE 6 shows the key success criteria and their fulfillment as of early January 2017.

TABLE 6: Overall success criteria and their fulfillment

SUCCESS CRITERIA	
Target	Actual / Expected
#1 Turnover from pilot project is achieved from April 2016.	The status as of January 2017 is that 275 stores are implemented. The pilot project created turnover already from January 2016 and steadily onwards.
#2 The strength of the relationship with the customer should be 4.5 when the project finishes.	The accumulated average of the customer pulse checks amounted to a total of 2.7. The internal and external reference group meetings pace was discontinued after only two meetings. Various organizational aspects challenged the meeting pace as well as the size of the project room, and the availability of the external customer.
#3 The duration of the project is reduced by four months compared to other projects.	The pilot project was able to launch the first stores after five months which is considerably shorter than comparable reference projects, which has had lead times of 10 months or more.
#4 Team evaluation of pilot project is minimum 4.5 when the project finishes.	The accumulated average of the team pulse checks amounted to 3.3. It is difficult to come to any conclusions based on only measurements points. That said it seems fair to state that the reason behind the relatively low average was the rather large change and thus differences in project management, which PHD methodology presented for the project team. The team expressed some dissatisfaction with being colocated due to the rather small project room, a high noise level and less comfortable working conditions.

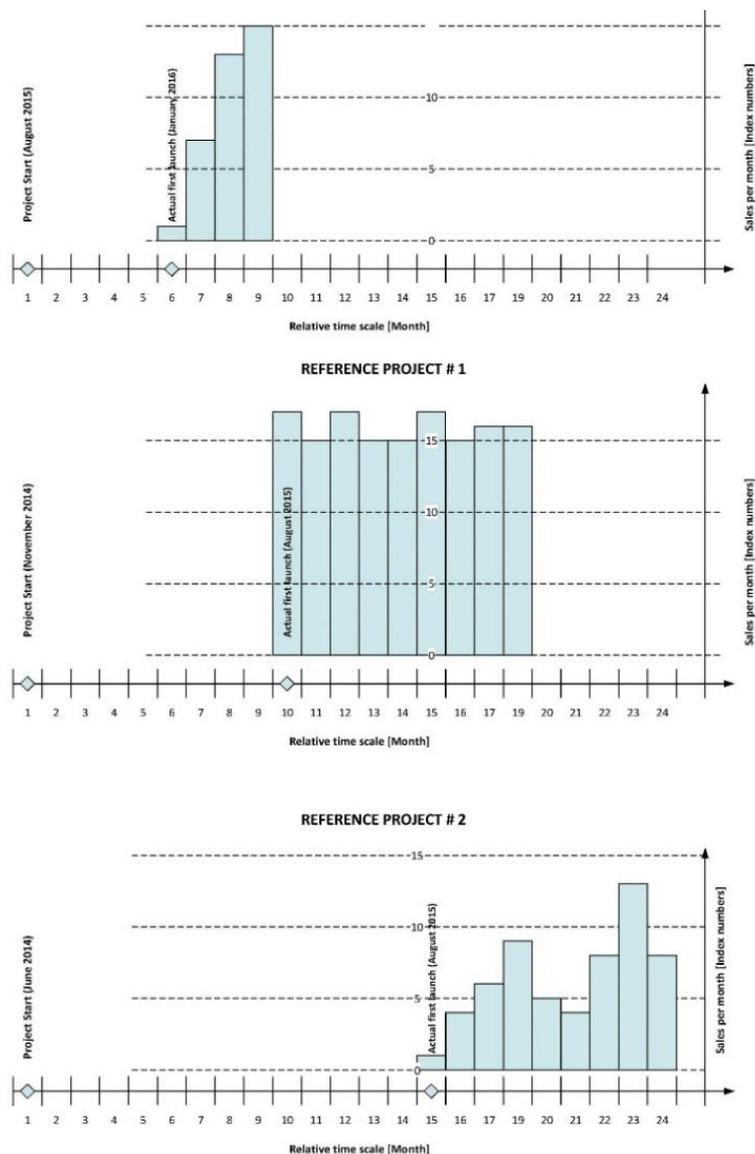
Comparing Pilot Project with Reference Projects

Taking point of departure in the pilot project, LU selected two comparable reference projects. Both the pilot and the two reference projects closed in January 2017. The results in the form of sales per month across the pilot and comparable reference projects are shown FIGURE 3.

The figures show the relative start date and duration of the projects in number of months on

a standard 24-month scale. The columns show when and how much sale is generated in each project until May/June 2016. The number of columns does not represent the length of the sales generating period, but the number of month data is available. As can be seen from FIGURE 3, time to impact, meaning the period from the projects start to the first sales are generated, is considerably shorter in the pilot project than in the two reference projects.

FIGURE 3: Time to sales levels across projects



Whereas the reference projects start generating sales in months 10 and 15, the pilot project starts generating sales only after 6 months.

The reasons for this difference may be many. As the objective of this report is to evaluate the Half Double Methodology, we look towards this model as an intervention that might explain the shorter lead time. To detect to what extent the pilot project reflects the Half Double Methodology compared to the reference projects, the practices of the projects are compared to the principles of the Half Double Methodology.

This analysis shows that the pilot project stands out and scores significantly higher when it comes to the practices of colocation and short and fat projects. These results indicate that the practices inspired by the Half Double Methodology hold a possible explanation of the pilot project's superior performance .

COLOPLAST PILOT PROJECT

Company and Pilot Project

Coloplast is a global medical device company. The company was established in 1954 with the invention and production of the first Coloplast stoma bag and today the business includes ostomy care, continence care, urology care and wound care and skin care.

Key figures:

- Approximately 10,000 employees around the world
- Total revenue of DKK 13,909 million
- Head office: Humlebæk, Denmark

Coloplast develops and markets products and services that make life easier for people with very private and personal medical conditions. Coloplast works closely with users to develop solutions that consider their special needs. Coloplast markets and sells its products and services globally and supplies its products to hospitals, institutions as well as wholesalers and pharmacies. In selected markets, Coloplast is also a direct supplier to users (homecare).

The Coloplast pilot project is a product modification project. It is set up in the Coloplast Supply Value Stream (SVS) department. This department primarily works with product modifications in the current production. The project is a typical product modification project,

TABLE 7 shows a brief overview of the project's key activities.

TABLE 7: Brief overview of the pilot project's key activities

TIMING	DESCRIPTION
December 2015	Initiation meeting. First draft of impact case.

and Coloplast executes a number of this type of project each year. The core project group consists of people from the Global Quality organization situated at the main office in Denmark. Further, the project is allocated staff from various departments in Denmark as well as staff from the Coloplast production site in Hungary. The project was initiated by Corporate Procurement as part of an overall program to minimize raw materials dependencies and hence the overall risk of production related to raw materials. The project is in the execution phase, which is expected to be completed in April 2017, and the project continues to use elements from the Half Double Methodology. The project had to be redefined in order to support Coloplast's commercial strategy, which required that several deliverables be aligned with the R&D department.

The main aim of the Coloplast pilot project is to eliminate the need for re-planning and repeated production testing. The key challenge of the product modification project can be split into two main parts: (1) the first challenge is facilitation of efficient communication and coordination among the many participants, and (2) the second challenge is to develop a risk and problem management process that fits into this special situation.

TIMING	DESCRIPTION
January 2016	Pilot project initiation.
February 2016	Kick off in Hungary. Introducing PHD to the factory.
Marts 2016	Kick off in Denmark. The first version of a main visual plan is designed by the participants.
April 2016	Weekly planning and coordination meeting and second sprint planning meeting.
May 2016	The team is working intensively with the first important deadline.
April 2017 (expected)	Execution phase completed (including screening, validation, stabilization etc.).
Not defined yet	Project closure.

TABLE 8 shows the key success criteria and their fulfillment as of early January 2017.

TABLE 8: Overall success criteria and their fulfillment

SUCCESS CRITERIA	
Target	Actual / Expected
#1 Reduced time consumption and improved time to impact.	To be evaluated after project closure. <i>Preliminary evaluation:</i> Early impact design combined with the established flow has successfully frontloaded collaboration and risk management and mitigated costly risks. E.g., it was identified that a clinical trial was needed and that it could be combined with an already planned trial, potentially saving DKK 1m+ as well as time. Further fulfilment will be evaluated during and after the execution phase.
#2 Reduce numbers of tests and iterations.	To be evaluated after project closure. <i>Preliminary evaluation:</i> The number of test production runs needed cannot be evaluated until after the execution phase. Currently action has been taken to minimize risks by involving the production site and mapping their risks and problems, especially dependencies on the remaining project group. <i>Result:</i> Early in the screening phase, the project team frontloaded alignment in the current production baseline by working with risk/frontloading when planning the screening. This will ensure reliable results from the final qualification when selecting representative production lines.
#3 Reduce re-planning through improved coordination.	To be evaluated after project closure. <i>Preliminary evaluation:</i> The main project plan was established as collaboration. Whether the project will need to be re-planned is uncertain until after the execution phase. So far, improved coordination using weekly and monthly meetings, pulse checks, and visual tools has been achieved.
#4 Risks and problems mapped early and continuously throughout the project. Improved risk management facilitates “right”	To be evaluated after project closure. <i>Preliminary evaluation:</i> Risks and problems have been mapped on three levels of the project. This was done by the management group at the production site in Hungary, and at the kick off in Denmark. This has already been crucial in identifying risks and has been a solid argument towards the steering committee to recruit the resources needed to conduct laboratory tests. Moving ahead, a KPI or matrix must be established in order to keep track of the risk management of the project.

SUCCESS CRITERIA	
Target	Actual / Expected
decisions and willingness.	Together with the supplier, the project team works to define the tolerance levels in the recipe in order to facilitate the right decision and improve risk management.
#5 New way of running projects used in other projects. The concepts of front-loading risk and the new way of running the adjustments projects is used on upcoming projects.	To be evaluated after project closure. <i>Preliminary evaluation:</i> The project leader and the management group have already reflected on how the risk methodology can be applied in other similar projects, but no specific plans or decisions have been made yet. They want to see how the risk handling progress in this project performs over a longer time frame. Implementation of both the methods and tools for all supply value stream projects has been planned.
#6 Participation in coordination meetings. A changed mindset is needed.	To be evaluated after project closure. <i>Preliminary evaluation:</i> Currently there is a high degree of participation in the weekly and monthly coordination meetings as well as in the project kick off. There is no participation log, nor any rules concerning participation. The project leader wanted to invite the project members to participate in these meetings and let them make an individual, professional decision as regards the benefit of their meeting participation not only on their own individual level but also on a higher project level. Experience shows that new project participants get a good overview of the project due to this meeting set-up.
#7 Key stakeholders experience a higher degree of transparency in the project process and risk handling. This contributes to a shorter execution phase.	To be evaluated after project closure. <i>Preliminary evaluation:</i> Pulse check data – still too early to evaluate. Regular alignment meetings are being held in order to maintain a high degree of transparency and to improve risk management with the Innovation Value Stream (IVS) project. This is expected to contribute to a shorter execution phase.

NOVO NORDISK PILOT PROJECT

Company and Pilot Project

Novo Nordisk is a global healthcare company with more than 90 years of innovation and leadership in diabetes care. Novo Nordisk covers more than half of the world's insulin. The company was established in Denmark in 1923 and is specialized within hemophilia, diabetes, obesity and growth disorders.

Key figures:

- Approximately 41,600 employees
- Annual sales: DKK 107,927 million (2015)
- Head office: Bagsværd, Denmark. Affiliates in 75 countries and R&D centers in China, Denmark and the US

Novo Nordisk's commitment and contribution is to prevent, treat and ultimately cure diabetes, to discover and develop innovative biological medicines and make them accessible to patients throughout the world.

When Novo Nordisk decides to change a production location or to use a more cost-efficient production method, health authorities in

TABLE 9 shows a brief overview of the project's key activities.

each relevant country must approve these decisions. As a result, Novo Nordisk is required to plan and produce different variants of the same product (Stock Keeping Unit) depending on the country-specific health authority approvals.

The pilot project is categorized as an IT enhancement project with the purpose of creating a more stable and flexible variant planning solution incorporating future business requirements. The current IT solution is cumbersome and complex resulting in sub-optimal processing while requiring constant monitoring to ensure integrity.

Initially the project was planned for launch in February 2017 following the classic IT development approach of *analyze, specify, develop, test and launch*, but the project was redesigned in the Half Double process leading to a first launch in June 2016 and a second launch in September 2016. There are approximately 25 end-users and all Novo Nordisk production sites are impacted by this new solution.

TABLE 9: Brief overview of the pilot project's key activities

TIMING	DESCRIPTION
October 2015	Pre-analysis was concluded and official project was initiated
November 2015	Review team meetings initiated and impact case finalized
December 2015	First sprint started covering design, build and test activities
January 2016	First prototype of part of solution ready for test and first draft on KPI's defined
February 2016	Development and unit testing of first part of solution completed
March 2016	Gate 3 approval of project by local Novo Nordisk IT Council

TIMING	DESCRIPTION
April 2016	Development and unit testing of second part of solution completed
May 2016	User Acceptance Test of solution parts 1+2 completed successfully & KPI baseline established
June 2016	User go-live of first part of solution (Master data determination and creation)
September 2016	User go-live of second part of solution (Variant Planning)
January 2017	Gate 4 Approval - Hand-over to operation
March 2017 (expected)	Gate 5 Approval - Benefit realization

TABLE 10 shows the key success criteria and their fulfillment as of early January 2017.

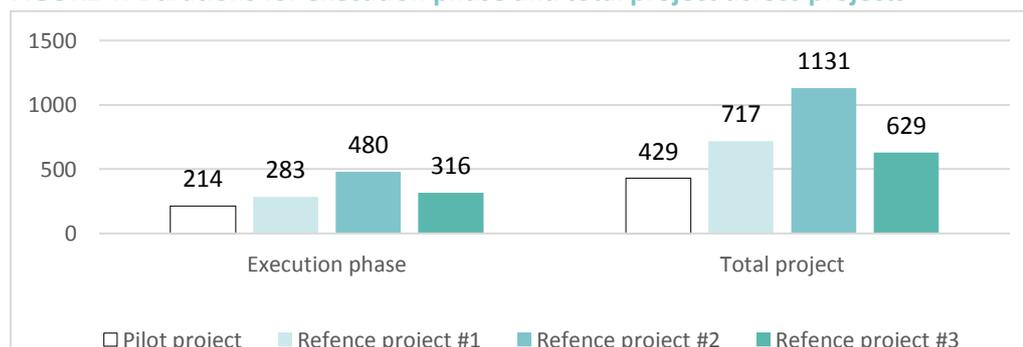
TABLE 10: Overall success criteria and their fulfillment

SUCCESS CRITERIA		
	Target	Actual / Expected
#1	Improve project solution with regard to: (1) variant planning, (2) performance and stability, and (3) trustworthiness.	(1) Achieved (2) Achieved (3) Partially achieved at G4, to be re-evaluated at G5
#2	Reduced time for pilot project impact, where go-live time is accelerated from originally planned in February 2017 to September 2016. Go-live is further accelerated for part of the solution to June 2016.	Achieved, releases were launched June 2016 and September 2016, which is considerably shorter time to launch than originally planned (February 2017)
#3	Ensure continuous progression through establishing a fixed pace for the project. A fixed pace includes colocation of core team 60% of the week and key flow events. Weekly solution feedback with feedback team etc.	Achieved
#4	Weekly review meetings to ensure close interaction and feedback from key stakeholders. Review meetings include weekly pulse check, visual planning and other visualizations of the project and the solution.	Average pulse check results from November 2015 to October 2016 are: Core team: 4.4, Review group: 4.5 and Steering group: 4.4
#5	Iterative development through close cooperation between IT and Line of Business	Achieved with high stakeholder satisfaction

Comparing Pilot Project with Reference Projects

The duration of the pilot project was compared with three reference projects shown in FIGURE 4.

FIGURE 4: Durations for execution phase and total project across projects



The bar chart in FIGURE 4 shows that the pilot project has the shortest duration for both execution phase and total project. As mentioned the projects are comparable where a proxy for project size indicates that the pilot project and reference project #4 are smallest, reference project #2 is second in size, and reference project #3 is the largest. Furthermore, this could be related to the target launch date for the pilot project (originally scheduled in February 2017), which was divided into two launches in June 2016 and September 2016 respectively as part of introducing the Half Double Methodology. Both

factors support that the pilot project was carried out faster than usual for comparable projects. The shorter execution time for the pilot project also means that impact can be achieved faster – an example is the improved performance of the planning solution, where a batch process is reduced from 16 hours to less than 1 hour, which has a positive business impact.

Reducing project duration may have the unintended consequence of reducing quality, but this was not the case with this pilot project as shown in TABLE 11:

TABLE 11: Quality and benefit key performance indicators across projects

PROJECT	PILOT PROJECT	REFERENCE PROJECT #1	REFERENCE PROJECT #2	REFERENCE PROJECT #3
Budget	Partially achieved (new estimate in execution phase)	Partially achieved (schedule delay increased cost)	Achieved	Achieved
Schedule	Achieved	Partially achieved (schedule was postponed twice)	Achieved	Achieved
Scope	Achieved	Achieved	Achieved	Achieved
Benefit realization	Partially achieved (two areas achieved and one partially achieved)	Achieved	Achieved	Partially achieved (super user training insufficient)
User satisfaction	Score 4.4 for core team and steering group and 4.5 for review team	Score 4.2 (max 5 and target was 4.0)	Score 4.4 (overall user satisfaction)	Score 3.6 (including user and super user)

TABLE 11 shows that the pilot project key performance indicators are comparable to the three reference projects suggesting that the quality of the deliverables from the pilot project was more than appropriate, and that the benefits in general were achieved. Several practices appear

to be important for achieving the shorter duration in the pilot projects: (1) quick insight, (2) short and fat projects, (3) working with visuals, and finally (4) using the steering committee for development and sparring.

GN AUDIO PILOT PROJECT

Company and Pilot Project

GN Audio is part of GN Great Nordic, a Danish-based technology group founded in 1869. GN Audio was founded in 1987 and is among the leading and fastest growing suppliers of intelligent audio solutions. GN Audio operates in three regions: 1) America, 2) Europe, the Middle East and Africa and 3) Asia-Pacific.

Key figures:

- Approximately 1,000 employees
- Revenue of DKK 3,229 million (2015)
- Earnings Before Interest, Taxes, Depreciation and Amortization of DKK 540 million (2015)
- Head office: Ballerup Denmark

TABLE 12 shows a brief overview of the project's key activities.

TABLE 12: Brief overview of the pilot project's key activities

TIMING	DESCRIPTION
March 2016	Project kick off: Impact Solution Design, Mindset workshop with key stakeholders, On boarding of core team
April 2016	First sprint initiated and completed and second sprint initiated, pulse checks
May 2016	First Steering Committee meeting, Roles and responsibilities defined and accepted, Development phase initiated
July 2016	Test phase completed, Major marketplace ready to be launched, presentation of findings and results

The project was closed by mid July 2016.

TABLE 13 shows the key success criteria and their fulfillment as of early January 2017.

The pilot project at GN Audio is categorized as a sales/IT project and is about developing new ways of working with digital sales. By launching a new marketplace through the application of the Half Double Methodology, GN Audio will be able to reduce project lead time and time to market dramatically. Concretely, the pilot project's ambition was to reduce GN Audio's project development lead time from nine to three months. Since its launch of online sales channels, one of GN Audio's challenges has been revolving around a tendency of stagnating launches due to heavy after work to correct errors from previous launches, thus tying up resources that could have been utilized elsewhere to perfect existing channels and to develop new channels.

Table 13: Overall success criteria and their fulfillment

SUCCESS CRITERIA	
Target	Actual / Expected
#1 Launch two channels with decreased complexity by 2017	Target is two channels by 2017 By January 2017 the number is 0: target to be evaluated
#2 Establish accountability & responsibility for quality, availability and accuracy for prices ¹ , order processing and inventory ² levels across channels	Price accuracy: Baseline: 75% by April 1 st 2016
	First target ^a is 90% Second target ^b is 100%
	By July 2016 the actual level is 99,7%: target more than reached By January 2017 the actual level is 100%: target reached
	Inventory accuracy: Baseline: 75% by April 1 st 2016
	First target ^a is 90% Second target ^b is 100%
	By July 2016 the actual level is 100%: target more than reached By January 2017 the actual level is 100%: target reached
	<i>Main reason for reaching targets: New architecture provides solid foundation for quality, availability and accuracy of prices and inventory.</i>
#3 To implement a New Way of Working with respect to resource impact, time to market and scoping of future digital projects. 1. Resource allocation impact ³ : 90% by June 2017. 2. Time to market: 30 days by December 2017. 3. Quality in channel data: Actual: 50% by April 2016 / Expected 85% by June 2016;	1. Resource allocation impact: Baseline: 60% by April 1 st 2016
	First target ^a is 70% Second target ^b is 80%
	By July 2016 the actual level is 80%: target more than reached By January 2017 the actual level is 90%: target more than reached
	<i>Main reason for reaching first target: On top of baseline, one IT function and one Sales function were secured and had tools to support post launch. Main reason for reaching second target: On top of go-live status, one Customer Service function was secured to support post launch. Only one Marketing function not secured for support post launch, so Sales has to take on this part.</i>
	2. Time to market: Baseline: +75 days by April 1 st 2016
Target is 60 days	By July 2016 the actual level is 79 days: target not reached*
	<i>Main reason for not reaching target: Test phase time underestimated. KPI set to include only launch of new channel in 60 days vs Half Double pilot project which included both development of new foundation/architecture and launch of new channel. *However: Two new marketplaces were launched within 18 and 26 days vs 43 days for previous marketplace launch - so significant improvements in time to market at higher quality were made.</i>
	3. Quality in channel data: Baseline: 50% by April 1 st 2016
First target ^a is 85%	By July 2016 the actual level is 88.6%: target more than reached
	<i>Main reason for reaching first target: The new foundation/architecture enabled delivery of channel specific content such as</i>

SUCCESS CRITERIA	
Target	Actual / Expected
99% by Dec 2016.	<i>category, features, KSPs, description, technical bullets and video which had not earlier been available.</i>
	Second target ^b is 99% By January 2017 the actual level is 98.2%: target not reached
	<i>Main reason for not reaching second target: Not all content elements were fully populated for all products.</i>
#4 Deliver 99% accurate & channel specific content ⁴ and rich media for all digital sales channels and marketplaces.	<p>Content accuracy:</p> <p>Baseline: 70% by the 1st of April 2016</p> <p>By July 2016 the actual level is 88.6%: target not reached</p> <p>By January 2017 the actual level is 98.2%: target not reached</p> <p>First target^a is 90%</p> <p>Second target^b is 99%</p> <p><i>Main reason for not reaching targets: The accountability and resources to ensure availability of data were not fully anchored in organization.</i></p> <p>Channel specific content such as features and KSPs as well as rich media such as videos has been delivered to channels and marketplaces as part of the GN Half Double project.</p>
	^a First target is set to go live
	^b Second target is set to six month after go live

Comparing Pilot Project with Reference Projects

The pilot project was compared with three reference projects on a number of parameters

shows three of them: scope, time and quality in terms of accuracy on four dimensions (content, integration, pricing and inventory).

TABLE 14: Time and accuracy across projects

	PILOT PROJECT	REFERENCE PROJECT #1	REFERENCE PROJECT #2	REFERENCE PROJECT #3
Functionality/scope	Platform and channel related	Channel related	Channel related	Platform related
Time to market	79 business days (16 weeks)	63 business days (13 weeks)	122 business days (24 weeks)	84 business days (17 weeks)
Content ⁴ Accuracy	88.6% (t1: 19.07.16) 98.2% (t2: 01.08.17)	70.0% (t1: 21.11.15) 70.6% (t2: 20.05.16)	95.6% (t1: 28.07.14) 98.9% (t2: 27.01.15)	N/A
Integration ⁵ Accuracy	99.7% (t1) 100% (t2)	92.5% (t1) 98.8% (t2)	89.0% (t1) 100% (t2)	N/A
Pricing ¹ Accuracy	99.7% (t1) 100% (t2)	98.2% (t1) 99.7% (t2)	94.5% (t1) 98.9% (t2)	N/A

	PILOT PROJECT	REFERENCE PROJECT #1	REFERENCE PROJECT #2	REFERENCE PROJECT #3
Inventory ² Accuracy	100% (t1) 100% (t2)	98.2% (t1) 100% (t2)	93.4% (t1) 100% (t2)	N/A

TABLE 14, the pilot project has a reduced lead time to market compared to reference projects 2 and 3. Reference project 1 has a shorter time to market but also a smaller scope: it is only a channel project whereas the pilot project is both a channel and a platform project.

The pilot project also delivers higher quality when it comes to accuracy compared to the reference projects: measured on four dimensions the pilot project has a higher accuracy rate on all dimensions at all times (except for inventory t2 where the rate is the same) compared to reference project 1 and a higher accuracy rate than reference project 2 when it comes to integration (t1), pricing (t1 and t2) and inventory (t1). Reference project 3 cannot be measured on these terms as it is purely a platform project.

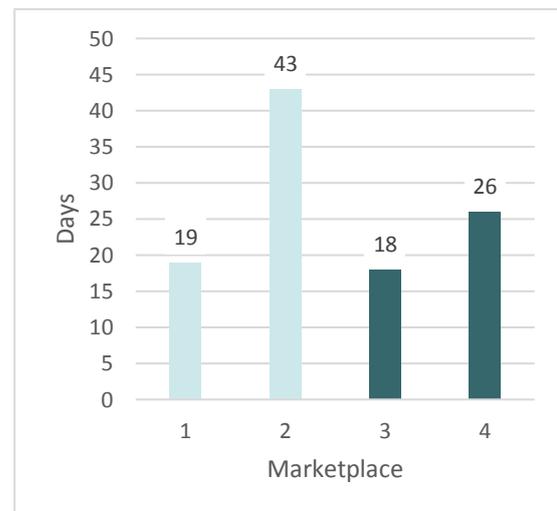
The positive results of the pilot project stand out even stronger when the scope of the different projects is taken into account: the pilot project is both a platform and a channel project whereas the reference projects are either a channel project or a platform project. Moreover, less information is processed in reference project 2 and therefore this project has a lower risk of accuracy mistakes compared to the pilot project.

The accuracy levels are important especially at go live as low accuracy rates cost time and money to fix and can result in lower customer satisfaction and loyalty as well as a lower conversion rate leading to lower sales if customers experience problems. In this way the accuracy levels are quality measures indicative of the project’s impact in terms of revenue growth due to lower costs and greater sales to more satisfied and loyal customers.

Therefore these measures are vital – also when considering the time perspective.

FIGURE 5 shows launches of four marketplaces and the number of days from the marketplace project is initiated to a soft launch is in place.

FIGURE 5: Number of days from start to launch across marketplaces



The light colored marketplaces (1 and 2) taking 19 and 43 days respectively to launch are run before the Half Double Methodology is implemented whereas the dark colored marketplaces (3 and 4) taking only 18 and 26 days to launch are run after using the Half Double practices.

It should be noted that the launches of the different marketplaces have different scopes, which of course affect their lead time – the most comparable cases in terms of scope are marketplace 2 taking 43 days and marketplace 4 taking only 26 days and relying on the Half Double Methodology.

It is difficult to come up with explanations for the improved performance of the pilot project – as the reasons for achieving the shorter lead time to market and the higher quality accuracy rates can be many.

When we consider the practices used in the different projects, we do not find that the pilot project sticks out in any positive way concerning the Half Double practices. On the contrary, the pilot project scores significantly lower on the

practice regarding short and fat projects – which is surprising and requires further analysis.

According to the project manager, the establishment of the new foundation/ architecture providing clear organizational responsibility, the structure of the data feed providing content quality, and the reduced post processing reducing time to market all play a major role in the improvements obtained.

Table 15 describes the notes from Table 13 and Table 14.

TABLE 15: Notes on measurements

NOTES	
1.	Price accuracy is measured as incidents of products with price errors compared to total number of products
2.	Inventory accuracy is measured as incidents of products with inventory errors compared to total number of products
3.	Resource allocation impact is measured as number of functional departments that are allocated for support post launch - typically each department has one contact (functions include 4 Sales & Marketing, 3 IT, 3 external channels and 1 Customer service)
4.	Content accuracy is measured as incidents of products with content errors compared to total number of products
5.	Integration accuracy is measured as incidents of products with integration errors compared to total number of products – including system performance/downtime, database and data feed formatting issues

VELUX PILOT PROJECT

Company and Pilot Project

The **VELUX Group** is a building materials manufacturer offering roof windows and modular skylights as well as a range of decorative elements, blinds, roller shutters, installation solutions and remote controls. The company was founded in 1941 and is owned by VKR Holding A/S, which is wholly foundation and family-owned.

Key figures:

- Approximately 9,500 employees around the world
- Total revenue of DKK 17,734 m
- Head office: Hørsholm, Denmark

The VELUX Group has manufacturing and sales operations in more than 40 countries and has manufacturing in nine countries. As one of the strongest brands in the global building materials sector, the company works towards creating better living environments for people around the world – using daylight and fresh air – through products that help create bright, healthy, energy-efficient environments in which to live, work, learn and play.

The **pilot project** is set up on two levels.

On an overall portfolio level, an organizational change project is initiated with the aspiration of shortening the time to impact on projects in the total portfolio across the company. The intent of the project is to accelerate efforts set to reduce time to impact in projects and realize benefits faster.

On a lower project level, a technical development project is initiated with the aim of facilitating data collection of homepage visits. The purpose of the project is to reduce time from website entry and inquiry to sales by targeting and guiding customers towards relevant information and products based on knowledge about their interests and behavior.

Report 1 covers only the portfolio project. Because the initial success criteria evaluated in this addendum are based on the portfolio project and as data is not yet available for the lower level projects, the rest of this chapter will focus exclusively on the portfolio project.

Table 16 shows a brief overview of the project's key activities.

TABLE 16: Brief overview of the pilot project's key activities

TIMING	DESCRIPTION
Feb 2016	First meeting regarding portfolio pilot project: idea and scope discussion.
Mar 2016	Introduction to PHD and meta pilot project, impact solution design.
Apr 2016	Selection of two experimental pilot projects, impact solution design, communication, first pulse checks.
May 2016	First review team meeting, first practitioner workshop: training and anchoring new mindset.
Jun 2016	Development part of portfolio pilot project is closed.
Apr 2017 (expected)	One experimental pilot project is closed and handed over to operations.

Table 17 shows the key success criteria and their fulfillment as of early January 2017.

TABLE 17: Overall success criteria and their fulfillment

SUCCESS CRITERIA	
Target	Actual / Expected
#1 Higher benefit soon realized by using Half Double approach to organizational change.	Higher engagement and awareness in the organization due to higher involvement and use in practice as the project developed.
#2 Time to benefit on “Benefit Faster” reduced by five months (from September to March).	Time to benefit reduced from 12 to five months.
#3 Two category C projects designed to realize benefits faster. Benefit solution design approved by project owner within two months.	One category C project designed to realize benefits fast. Benefit solution design approved by project owner during the Benefit Faster approach.
#4 Stakeholder satisfaction above 3.5 (Pulse check).	Average stakeholder satisfaction develops from 4.50 to 4.67 and 4.08. The last pulse check scores 4.00 and yields an average across the four scorings that equals 4.25 compared to the target of 3.5.

Comparing Pilot Project with Reference Projects

The portfolio pilot project was compared with a reference project at the same level on a number of dimensions.

FIGURE 6 shows the performance of the portfolio pilot project compared to the portfolio reference project regarding the roll out process of the solution developed in terms of speed and coverage.

The pace and extent of the implementation of the developed solution are measured in number of months (horizontal axis) before the global solution is implemented in a number of local project models (vertical axis).

The reason why the darker pilot project line stops before the lighter reference project line is that pilot project data is only available for the first 12

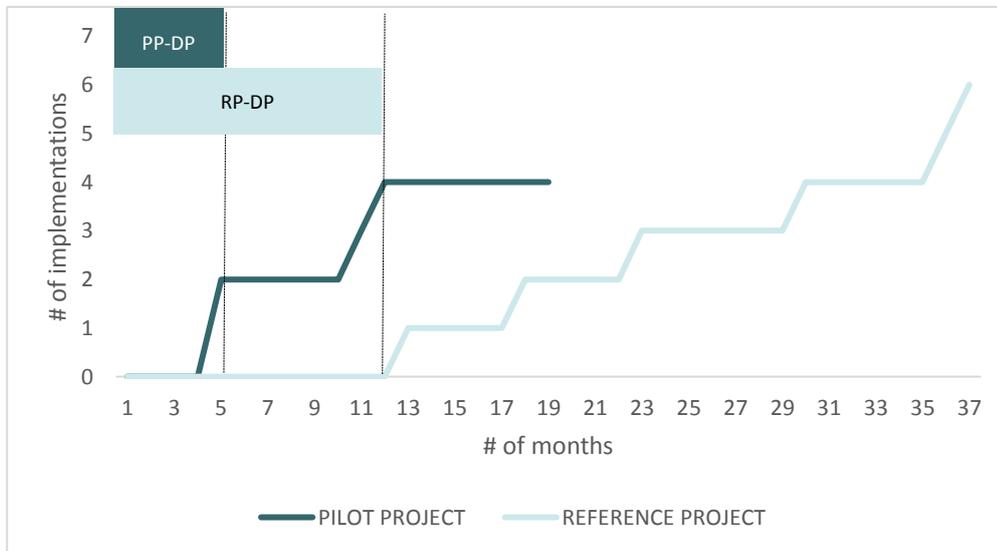
months from February 2016 until January 2017 when this addendum is published: the reference project started earlier and therefore includes data for more months.

As can be seen from the figure, the scope of the pilot project’s solution implementation is broader (higher) from the beginning and throughout the comparable data period. Moreover, when comparing the first pilot project’s development phase marked PP-DP, which lasts five months (from the beginning of February 2016 to the end of June 2016) to the reference project’s development phase marked RP-DP, which runs for 12 months (from January 2014 to December 2014), the pilot project solution is developed in less than half the time. In addition, the pilot project is implemented in two project models 25 days before the solution is fully developed whereas the reference project’s implementation begins the day after the solution is developed.

These differences suggest a superior pilot project performance regarding the success criteria of

accelerating time to impact in order to obtain benefits faster.

FIGURE 6: Pace and extent of solution implementation across projects



The pilot project’s shorter development and implementation phase imply that impact may be achieved faster – assuming that the solution developed leads to improvements in the project management processes.

This assumption is to be analyzed through a comparative analysis of the pilot and reference projects at the lower level when data is available.

The pilot project scores significantly higher than the reference project on several of the Half Double practices – including colocation and visuals as well as quick insights and short and fat projects.

CONCLUSION

The purpose of this addendum is to document the developments in the pilot projects from June 2016 to January 2017 with particular focus on the impact they have created. This Addendum is a supplement to the Phase 1 report (Svejvig, Ehlers et al. 2016).

The study of the seven pilot projects shows that:

- The Lantmännen Unibake, Novo Nordisk, GN Audio and VELUX pilot projects appear to have had a positive effect from using Half Double Methodology
- Grundfos and Siemens Wind Power pilot projects seem to have had little effect from using Half Double Methodology
- The Coloplast pilot project is still taking place, so we are not able to comment on the potential effect of the Half Double Methodology

Evaluation and comparison of projects (Svejvig and Hedegaard 2016) are a “dangerous endeavor”, and there is a complex relationship between using a project methodology and the

resulting project performance (project success) which is influenced (moderated) by the project environment (context) (Joslin and Müller 2016). We certainly acknowledge the complex causation between context, methodology and project performance (see also Befani, Ledermann et al. 2007) and our claim is confined to the following proposition:

Applying the Half Double Methodology can lead to an apparently higher impact from the pilot projects compared to comparable reference projects in the same organization

We furthermore show that a positive effect apparently applies to four out of the seven pilot projects while two pilot projects have had little effect from using the Half Double Methodology and the last pilot project could not be evaluated, as it is still ongoing. Please refer to appendices A and B for an elaborate description of the research methodology and not least the limitations of this study.

APPENDIX A: RESEARCH METHODOLOGY

The purpose of research in Project Half Double is to evaluate the impact of the Half Double Methodology (HDM) and the degree to which this new project paradigm may increase the success rate of projects. The research process was carried out in parallel with the seven pilot projects in order to learn from them and with the purpose of comparing these pilot projects with other projects using traditional methods. However, it is challenging to compare projects as they are distinctive and contingent as indicated by the classic definition of projects as “*A temporary endeavor to create a unique product, service, or result*” (Project Management Institute 2004: 368). Consequently, a clear definition of the evaluation criteria and rules for comparison is required. Therefore, we designed a comparison framework to evaluate and compare the pilot projects with other projects labelled as reference projects in the same organization. This was done to assess the degree to which the HDM is successful and more effective than traditional approaches in reducing time to impact (Svejvig and Hedegaard 2016). In this section, we briefly introduce the design of the evaluation and comparison framework and the process of data collection and analysis.

Action design research

Overall the research can be labelled as engaged scholarship where we co-produce knowledge with practitioners and are engaged in intervention (Van

de Ven 2007). Particularly, we frame the research approach in Project Half Double as action design research (ADR) adapted from the information systems domain “*ADR is a research method for generating prescriptive design knowledge through building and evaluating...artifacts in an organizational setting*” (Sein, Henfridsson et al. 2011: 40). ADR consists of four interleaved stages: (1) problem formulation; (2) building, intervention, and evaluation; (3) reflection and learning; and (4) formalization of learning. ADR also involves seven principles shown together with the four stages in Table 18 below, which outlines the action design research process (inspired by Gregor, Imran et al. 2014). It is an iterative process moving back and forth between the different stages as stipulated in the ADR method (Sein, Henfridsson et al. 2011). As shown in Table 18, the ADR process entails a problem-solving cycle and a research cycle (Mathiassen, Chiasson et al. 2012). These two cycles are intertwined (Svejvig and Hedegaard 2016).

The research cycle designed a comparison framework. This artifact works at two operationalization levels (Pries-Heje and Baskerville 2008) as a general comparison framework and as a specific comparison framework for each of the seven organizations involved in Project Half Double.

TABLE 18: The action design research process related to Project Half Double

STAGES AND PRINCIPLES	APPLICATION OF STAGES AND PRINCIPLES IN PROJECT HALF DOUBLE (PROBLEM-SOLVING CYCLE)	APPLICATION OF STAGES AND PRINCIPLES IN THE RESEARCH PART OF PROJECT HALF DOUBLE (RESEARCH CYCLE)
STAGE 1 Problem formulation		
<ul style="list-style-type: none"> • Principle 1: Practice inspired research 	Project Half Double is driven from practice with the overall objective to develop a new and radical project paradigm in order to increase the competitiveness of the Danish industry	The comparison framework is used to evaluate and compare the intervention process, especially practices and impact in order to assess the degree to which the HDM is more successful than traditional approaches
<ul style="list-style-type: none"> • Principle 2: Theory-ingrained artifact 	The artifact HDM is derived from lean and agile thinking (Womack and Jones 2003, Axelos 2015), and is related to the rethinking project management research stream (Winter, Smith et al. 2006, Svejvig and Andersen 2015).	The artifact “comparison framework” is based on open systems theory (Andersen 2010, Chen 2015), evaluation theory (Pawson and Tilley 1997, Stufflebeam and Shinkfield 2007), Diamond model for project characteristics (Shenhar and Dvir 2007).
STAGE 2 Building, intervention, and evaluation		
<ul style="list-style-type: none"> • Principle 3: Reciprocal shaping 	The HDM is applied to the pilot projects and experience from the pilot projects is used to revise and enhance the method.	The comparison framework was first developed as a general framework and later applied to each pilot project and re-shaped in each organization through an iterative process.
<ul style="list-style-type: none"> • Principle 4: Mutually influential roles 	There is mutual learning between practitioners, consultants and researchers both within organizations and across organizations, e.g. through knowledge sharing workshops – this learning process does also overlap the problem-solving and research cycles.	
<ul style="list-style-type: none"> • Principle 5: Authentic and concurrent evaluation 	The comparison framework is used to evaluate the pilot project and compare it with the reference projects.	The comparison framework is continuously discussed in interviews and workshops as part of the evaluation. A more structured review of the specific comparison framework was also carried out in each organization.
STAGE 3: Reflection and learning		
<ul style="list-style-type: none"> • Principle 6: Guided emergence 	Guided emergence reflects that the initial design of the artifacts (HDM and comparison framework) is shaped by its ongoing use and the participants who use the artifacts (Sein, Henfridsson et al. 2011: 44). This happens as a natural part of using the artifacts although it becomes more knowing and doing in practice (Orlikowski 2002), which only to some extent is codified and explicated.	
STAGE 4: Formalization of learning		
<ul style="list-style-type: none"> • Principle 7: Generalized outcomes 	The HDM as artifact is a generalized outcome which will (and has to) undergo more design cycles to reflect the learning that takes place in Project Half Double.	The comparison framework (both the general and specific for each pilot organization) is a generalized outcome where the specific comparison framework may also be generalized and applied to other settings.

The table is adapted from Svejvig and Hedegaard (2016).

The general comparison framework

The general comparison framework (GCF) is based on evaluation theory, models and applications (Patton 1997, Stufflebeam and Shinkfield 2007) and realistic evaluation (Pawson 2002). To this is added Shenhar and Dvir's Diamond model (2007) as well as project complexity models (Fangel 2010). The evaluation and comparison process thus build on a mixed method approach, where we combine quantitative and qualitative data (Tashakkori and Teddlie 1998, Biesta 2010). The GCF reflects an open systems view on projects (Bertalanffy 1956, Chen 2015), but is adapted from the realistic evaluation method consisting of three elements: Context (C) + Mechanism (M) =>

Outcome (O) (CMO model) (Pawson and Tilley 1997, Pawson 2002), which basically describes that the context and the mechanism (practices) used in a project lead to the outcome (Svejvig and Hedegaard 2016). We acknowledge the complex causation between C, M and O (Befani, Ledermann et al. 2007) and employ it conceptually to illustrate relationships between these elements, also known as a structural or interpretative explanation (Neuman 2014: 77-84). The basic CMO model is then merged with core concepts from project value creation consisting of project -> output -> outcome/change/impact (Laursen and Svejvig 2016).

FIGURE 7 shows the evaluation areas in this template.

FIGURE 7: Template for project evaluation

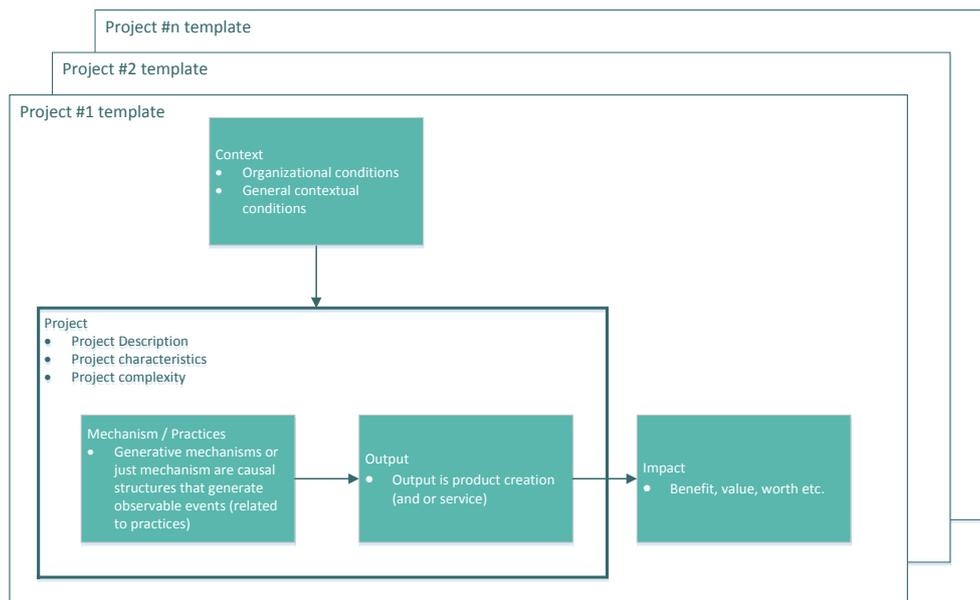


FIGURE 7 shows the five elements: context, project, mechanism/practices, output and impact. Context refers to organizational conditions like management style and project management maturity as well as general contextual conditions

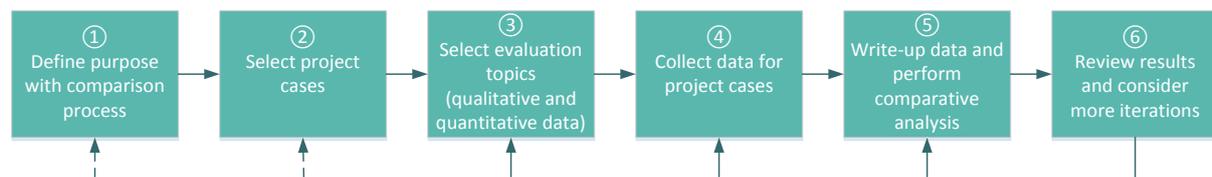
such as market conditions, which shape the project. The project itself has a description, characteristics and a complexity, which can be used to categorize the project. In the project, people execute practices, which are expected to

lead to tangible and/or intangible outputs (product and/or service creation), which finally have some impact in the short, medium and/or longer term (Serra and Kunc 2015, Laursen and Svejvig 2016).

This GCF was adapted specifically in every organization and operationalized in relation to each pilot project through an iterative process as illustrated in more detail by Svejvig and Hedegaard (2016).

The research process: In all of the seven pilot organizations, data was collected in the pilot

FIGURE 8: Research Process in pilot organizations (adapted from Svejvig and Hedegaard 2016)



Data collection

The pilot project and reference project managers participated in interviews lasting approx. two hours. The purpose of these interviews was to clarify the project characteristics and complexities. An adaptation of the Diamond model introduced by Shenhar and Dvir (2007) was used for this purpose. The Diamond model gives an overall indication of the similarities and differences between the projects selected. It includes the standard elements: complexity, novelty, technology, and pace. To decide on the project complexity measures, IPMA's characterization of management complexity (Fangel and Bach 2002, Fangel 2005, Fangel 2010) was used. This evaluation template was applied to all projects in order to facilitate comparison. Along with the Diamond model, cost and resources were treated as output measures and size proxies. Notions of impact were related to the individual project key performance indicators.

Moreover, the interviews were used to clarify "mechanisms" such as the practices employed in

project as well as in (at least) three other projects selected by the pilot organization as "reference projects". The research team met with each organization between 5-10 times at workshops and interviews. These interviews were supplemented by other relevant project documentation provided by the project managers (Myers 2009). FIGURE 8 outlines the general research process and the various activities at different stages in every pilot organization. The process was iterative especially between the stages 3 to 6.

the various projects as well as the project managers' experience and learning. Project practices were compared to the notions of impact, leadership and flow, proposed by HDM. Attention to project practices provides understanding of what (actually) happens in projects and how this might or might not affect the impact of the project. Projects as practice (Blomquist, Hällgren et al. 2010) refers to understanding what practitioners do and the tools they use, their interaction and intention and their joint episodes of activities. In order to compare pilot project practices to reference project practices, we asked the project managers in the reference projects to consider their project practices and compare them with the HDM principles. On a scale from 1-4, we asked them to score to what extent they had practiced these principles. Whenever possible, we made sure that an "alignment profile" e.g. head of project management, PMO manager, line manager etc. was present at the interviews to support comparison between the project scorings.

All interviews were recorded to secure rich documentation.

The project data for each organization was summarized in word documents and the project scorings were fed into tables. Data was then written into small reports on each organization and sent for review by the research participants in order to amend possible errors. Additionally, we carried out evaluation workshops to capture learnings from the pilot projects and to follow up on the fulfillment of the pilot project success criteria (performance evaluation).

Data analysis

The research process has resulted in a large amount of various forms of both quantitative and qualitative data, which will be analyzed and compared for each organization. Moreover, we intend to compare and contrast findings across the seven cases (Miles and Huberman 1994, Patton 2002).

Within each organization, the research team compared the pilot project to the reference projects based on various forms of data in accordance with the specific comparison framework. For example, project budget, cost, resources, characteristics, practices, etc. as well as the degree to which key performance indicators were achieved. Moreover, a crisp set qualitative

comparative analysis (Rihoux and Ragin 2009) was carried out on the project practice scorings in order to find patterns in the data suggesting that some practices may have impacted on the pilot project in contrast to the reference projects. This analysis was carried out in order to understand whether HDM represents something different from the way project practices were normally executed in each organization and how HDM may have impacted the results of the pilot project. Certainly, we are wary with emphasizing any causality but treat the outcomes of the analysis as indications of a possible impact.

In order to secure respondent validation of the analysis and findings, review meetings were held in all seven organizations with an outset in the first data “write-ups” (Silverman 2000). These meetings were used to discuss the appropriateness of the data material and the validity of the conclusions drawn from this material.

Data analysis has been ongoing all along the data collection process and is still not completed. As we want to follow the projects until and beyond their closure to track their long-term impact, both data generation and data analysis are expected to continue in a longitudinal study.

APPENDIX B: LIMITATIONS

The aim of this addendum is to document project results and to find indicators of the practical implications of using the Half Double Methodology (HDM) across seven organizations.

The addendum has tried to answer the question regarding the effect of the HDM by comparing the performance of a number of pilot projects applying the new HDM with comparable reference projects relying on established methodologies.

There are limitations to the findings presented in this addendum – and these should be taken into account when considering the conclusions.

This chapter gives an overview of some of the limitations of this study.

The first section describes general limitations that apply to all cases, whereas the second section outlines specific generalizations that apply to a specific project or organization.

General limitations

First of all, the addendum is a comparative study in which a vital part of the evaluation includes systematic comparison (Stufflebeam and Shinkfield 2007: 7-18, Bryman 2008: 58-61, Chen 2015) of Half Double-inspired pilot projects with reference projects. It is difficult to compare projects as all projects are unique and no projects are identical.

Although we try to take a holistic view of the projects by evaluating them in different conceptual frameworks and on a large number of dimensions, we cannot measure and control for everything. For instance, we analyze all projects in terms of complexity, pace and novelty based on Shenhar and Dvir (2007) Diamond model as well as size in terms of hours and cost inspired by Atkinson's (1999) classical triangle. However, these dimensions are of a rather "hard" and technical fact nature whereas more personal and

"soft" aspects pertaining to the people involved receive less focus. Although, for instance, the project approach as well as the competences and background of the participants are included as part of the complexity scoring (Fangel 2010), further research that takes a broader view of the project practitioners could be done. For instance, practitioners' experience, training, certificates, orientations and identity as well as project managers' leadership skills plus members' interactions and teamwork have not been substantially scrutinized.

In addition, aspects of the organizational context that influence the performance of the pilot and reference projects might have been overlooked. Although the pilot project is juxtaposed to a number of reference projects from the same organization, the organizational context is never the same. Instead the organization is always in flux and can be seen as an organizing process in constant movement (De Cock and Sharp 2007, Hernes and Weik 2007). Hence, there can be changes in the organizational culture or structure which circumstantiates the pilot and reference projects with different chances of success. Moreover, learnings from prior experiences are not taken into account. Neither are differences in competences and capabilities or maturity levels in terms of project management processes and end-users' perceived need for the product or service being developed and rolled out. Implications are that the pilot projects, which are typically done at a later point in time, often will have greater chances of success.

In addition, the Hawthorne effect (Roethlisberger and Dickson 1939, Baritz 1960) might be at play, namely that the fact that the pilot project practitioners know that they are being studied probably has an impact on their behavior and might increase the performance of the pilot project.

Moreover, it is possible that the increased attention and special treatment given to the pilot projects because of the new methodology in terms of extra resources from implement consultants to training and coaching as well as reflective talks and interviews with the research team affect results. It is also possible that the pilot projects being part of an optimization experiment and development process have been privileged with more and positive attention from top management compared to earlier reference projects. Following these lines, the halo effect (Neuman 2014: 4) might play a role in the performance improvements of some of the pilot projects. It seems plausible that many of the authors contributing to this addendum are biased towards PHD.

In general, one should be cautious towards the positivist understanding of the researcher as a neutral and detached observer (Bryman and Buchanan 2009). The addendum is based on a pragmatic and engaged scholarship study relying on a subjective ontology (Van de Ven 2007). Following a postmodern paradigm, it is hard to distinguish between the observed and the observer – between the subject and the object of study (Heidegger, 1992 in Rendtorff 2014). According to Bourdieu's reflective sociology, scientists are always imbedded in and part of the context and phenomenon they study and therefore their position has implications for the knowledge they produce (Mathiesen and Højbjerg 2013), and such reflections should be explicated.

Second, the addendum is an evaluative study in which the projects are classified as more or less successful. Project success is a multidimensional and contested concept (Judgev and Müller 2005) that lies in the eyes of the beholder (Joslin and Müller 2016). Therefore, the projects analyzed in this report might be perceived as more successful

by one stakeholder and less successful by another. Although we have tried to circumvent these issues by evaluating the pilot projects based on a set of broadly agreed upon success criteria established from the beginning of the project life cycle (Judgev and Müller 2005), criteria might change as the context changes and the project encounters unexpected circumstances. Moreover, learning arises as the project develops and new insight might change the project and its success criteria. Hence, success criteria and perceptions might change over time. In order to get a broader understanding of the projects' value creation, project performance should be evaluated in a long-term perspective (Laurson and Svejvig 2016) stretching beyond the timeframe of the first and second phases of PHD. Consequently, the success evaluation and classification of the projects documented in this addendum might change and the projects' performance might be different if viewed in another light at a later point in time. Such circumstances are, however, a natural part of doing this kind of action design research (Sein, Henfridsson et al. 2011, Svejvig and Hedegaard 2016) and should not be seen as a scientific error.

Third, as the HDM framework is an artefactual design in development, meaning that the HDM is adjusted and improved as it is applied and knowledge and learnings are obtained, the HDM changes over the course of the study. This means that not all projects are evaluated against the same practices. Such differences are not to be regarded as a rigorous error. Rather, these changes should be seen as a methodological precondition of an experimental process and a natural part of an action design research (Sein, Henfridsson et al. 2011, Svejvig and Hedegaard 2016) study in which practical change and knowledge production go hand in hand (Nielsen 2013).

Fourth, the same preconditions pertain to the comparative evaluation method that also develops through the learning process. For example, an implication of the improvement of the analytical framework is that the selection of reference projects has developed from an ad hoc process to a more structured and scientifically supported procedure in which the responsible project practitioners are assisted by the research team.

Fifth, it should be noted that although there is reason to believe in a positive relationships between project methodologies in general and project performance (Joslin and Müller 2016), it is not possible in this report to document a causal relationship between the improved performance of the pilot projects compared to the reference projects and the HDM. We cannot say that the performance improvements are caused by the HDM – but only state when we find indications that there might be a relationship: that the pilot and reference projects are similar or at least comparable on a large number of dimensions but different when it comes to practices – and that the explanation of the improved performance might lie in the variation in HDM practices.

Sixth, although data availability has increased substantially in this addendum compared to the phase 1 report (Svejvig, Ehlers et al. 2016), in some cases collection of the necessary data needed to document the relative performance of the pilot projects has not been possible. In other cases,

Specific limitations

Besides the general limitations, each organizational case and project study has some limitations.

data availability and access is vast. In these cases, possibilities of further analysis that would strengthen the results exist. Such analyses include triangulating the quantifiable scores with qualitative interview data. In addition, time to do a deeper analysis and look more into some of the intriguing specifics of a given organization or project could yield new knowledge and interesting insights.

Seventh, this addendum is not a critical review of the HDM and we do not pertain to questions regarding how radical the methodology is and to what degree projects can be delivered in half the time with double the impact. These statements are “consultancy jargon” and from a research perspective most likely exaggerated and overly optimistic. A comparative study based on a review of other project methodologies could highlight what the HDM offers compared to other methodologies.

Finally, the scope and sweet spot of the HDM is still under debate – the discussion might be extended to include broad concepts such as project setting and context relating to: 1) the impact of major public projects; 2) smaller projects which cannot be justified on their own; 3) cross-organizational projects with contractual frameworks, to mention some relevant areas.

All these limitations should be taken into account when considering the effects of the pilot projects inspired by the HDM.

Table 19 serves as an overview of the specific limitations of each of the seven organizational studies.

TABLE 19: Specific limitations for all organizations

SPECIFIC ORGANIZATIONAL LIMITATIONS	
Organization	Limitation
Grundfos	<ul style="list-style-type: none"> Some of the success criteria of the pilot project involve a later product development process. However, at the time of writing, only the frontloading phase of the pilot project was terminated. Moreover, one of the reference projects also did not finish the frontloading phase and another reference project is put on hold. Therefore, a full evaluation is not possible at present.
Siemens Wind Power	<ul style="list-style-type: none"> The pilot project is not finished, which means that data including impact is still not trackable. Lack of data including estimates on cost and resources like man-hours makes it difficult to compare the pilot and reference projects.
Läntmannen Unibake	<ul style="list-style-type: none"> In some reference projects the HDM practices were considered non applicable and consequently scored zero. For example, the practice “put people before models” was non-applicable and scored zero in one project because the organization did not have a model for project execution at the time of the project: since there were no standards or templates, there could be no conscious decision to prioritize models – however, it does not mean that they necessarily de-prioritized people.
Coloplast	<ul style="list-style-type: none"> Pilot project is still in progress and cannot be evaluated yet.
Novo Nordisk	<ul style="list-style-type: none"> The pilot project has just passed Gate 4 in the project model while all reference projects have passed Gate 5 and are finalized - therefore the total project duration and some of the KPI’s might change.
GN Audio	<ul style="list-style-type: none"> Not all data is registered in a systematic way when it comes to incidents reported in reference projects 1 and 2 affecting the accuracy rate, which has a reduced validity and might be lower. Reference project 2 is initiated earlier than the other projects and runs under other conditions in a much more complex organization before a restructuring, which makes the organization more mature in terms of project management capabilities. In the pilot project, which provides the foundation for the launch of 26 marketplaces within a year, there are circumstantial differences due to time and learnings: the more marketplaces are launched, the better and faster the organizational team becomes at performing its tasks.
VELUX Group	<ul style="list-style-type: none"> The pilot project is smaller in scope and initiated later than the reference project paving the way for the pilot project by developing and deploying a common language across organizational divisions increasing the organizational maturity and making it easier to implement the pilot project solution. On the overall portfolio level, there is only one reference project, which means that comparison is limited. On the lower project level, there are three reference projects but no data on the projects’ results and impact, which makes it difficult to document and evaluate the project’s relative performance.

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