ESCF OPERATIONS PRACTICES: INSIGHTS FROM SCIENCE

Hilti Integrated Planning Project

TU/e
EINDHOVEN UNIVERSITY OF TECHNOLOGY

DEPARTMENT OF INDUSTRIAL ENGINEERING & INNOVATION SCIENCES
CONCISE SUMMARY OF THIS BEST PRACTICE

Hilti is an organization supplying to professional construction companies using a direct sales model. They have been operating in the construction market since 1941. In 2013 Hilti launched the Hilti Integrated Planning (HIP) project. The HIP project started because, at the time, the company was operating without an organized Sales & Operations Planning (S&OP) process. The HIP project focused on integrating the end-to-end supply chain and creating a structured S&OP process. The main focus was to create full transparency throughout the supply chain. With this improved transparency, more educated decisions can be made, and the company can make use of the One Number Steering Principle. The HIP project has been successfully deployed in all markets (Sales Planning) and all plants (Supply & Operations Planning), and the results look promising. In the coming years, the aim is to further advance the S&OP process and integrate external suppliers.

KEY TERMS

Change management, Integrated Supply Chain, Sales & Operation Planning
Company Overview

The engineering brothers, Martin and Eugen Hilti were the founding fathers of the Hilti Maschinenbau OHG. In 1941 they established their company in Schaan, Liechtenstein. Twenty years later, Hilti has become a big and international organization that operates in thirty countries. As of 2019, Hilti has offices in 120 different countries, 29,000 employees and sales of approximately 6 billion Swiss francs.

Hilti provides cutting edge, high-quality products and services to its customers. They develop and manufacture solutions and products for the construction industry. The product portfolio ranges from specialized tools and consumables to chemical products. However, the corporate focus is on anchoring systems, firestops, direct fastening, electric tools like drilling and cutting, and diamond drilling. To provide their products, Hilti controls the goods flow from manufacturing plants to sales units. The supply chain includes about 650 suppliers managed by Global Sourcing. The flow of raw materials to the production plants is provided by these suppliers. Furthermore, the supply chain contains 14 production plants that are globally spread. Hilti has insourced about 70% of the warehouse activities, the majority of transport activities is outsourced.

With so many offices, plants, employees and suppliers, it is complex to control the entire supply chain. All processes are linked to each other. In order to improve processes, the information should be transparent. Therefore, the partnership between Hilti and the European Supply Chain Forum has worked for over eight years on the *Hilti Integrated Planning (HIP) project* (Van Wanrooij, 2012).
Problem Analysis

Prior to the Hilti Integrated Planning (HIP) project, the decision making was a fully decentralized process. Until this moment, Hilti had succeeded to operate in the market without a well-organized Sales & Operations Planning (S&OP) process. Nonetheless, it was becoming clear that to stay competitive, they needed a more organized S&OP. Therefore, in 2013, Hilti experienced that restructuring of the Materials Management and Planning was needed because the supply chain was subjective to conflicting targets, the bullwhip-effect, excess inventories, and high demand uncertainty. The Global Logistics Department responded to this need and thus executed the restructuring of the Materials Management and Planning. Obviously, with processes being far from optimal, a lot of improvement was possible. The restructuring by the Global Logistics Department resulted in the Hilti Integrated Planning (HIP) project. The HIP project aimed to increase service levels, reduce lead times, reduce inventories, contribute to OPEX savings and gain higher forecast accuracy. On top of that, the HIP project enabled a centralized, integrated planning for the end-to-end supply chain.

ONE NUMBER STEERING PRINCIPLE

Besides, before the Material Planning was integrated, each plant, material, or sales manager, made decisions based on local information sheets. As a consequence, the information was not transparent nor accurate. Therefore, Hilti pursues the One Number Steering Principle. The One Number Steering Principle aims to provide one information source, where each employee has the same information, the same ‘number’. By doing this, the full pipeline becomes more transparent and information will become more accurate. For this principle, the information must be based on different data sources that complement each other. Accordingly, the One Number Steering Principle enhanced the desire for the HIP project.
The Hilti Integrated Planning Project

The Hilti Integrated Planning (HIP) project was split up into four different aspects to support the Sales & Operations Planning (S&OP) process. First of all, the workflow needed to be integrated with a synchronized agenda. This integration contained all activities related to manufacturing, demand, and distribution planning. Secondly, the integrated sales planning process for the entire value needed to be driven by the **One Number Steering Principle**. The third aspect is Production and Distribution Planning; the central planning coordination of activities has to be on the operational-tactical level of the hierarchical planning. Lastly, the Organization Preparation; a central function is responsible for planning coordination on all hierarchical levels striving for end-to-end optimization.

Hilti is one of the few companies that completely controls the end-to-end supply chain. However, note that controlling the complete supply chain can be highly complex. This complexity, in turn, means that there are many possibilities to improve different parts of the supply chain. The goal is to create a stable environment. Only then, the company can be effective and efficient. Aforementioned, full transparency is one aspect of creating a stable end-to-end supply chain. Therefore, this has been one of the main goals of the Hilti Integrated Planning (HIP) project. By creating transparency, the reaction time in the whole supply chain will decrease. Furthermore, decision making will be more reliable when the information is combined and the same for every party in the supply chain. Instead of working for each other, different parties within the supply chain start to work with each other. Another aspect of creating a stable end-to-end supply chain is to define the critical points within the supply chain. In order to achieve high quality, these critical parts should be based on different perspectives. Identifying these critical parts can only happen once the right variables are measured. Thus, quality analysis, forecast biases, and multiple variables will be measured during the HIP project.
Transparency within supply chains can be seen as the two-way exchange of information and knowledge between customers and suppliers. The sensitivity of sharing information often interferes with the effectiveness and value of it. This interference between sharing and the effectiveness can happen because of customer domination in the relationship, or consideration of types of transparency might be insufficient (Lamming, Caldwell, Harrison & Phillips, 2001). The initial factor can be disregarded, where the second has become dissolved with the introduction of the HIP project.
Change Management

When introducing a new planning process, change management is a crucial aspect. As mentioned before, transparency leads to more educated decisions but not always to better results. Based on transparency, different employees will get decision making power. However, employees with different roles will have divergent opinions. Therefore, it is important that these divergent decisions are aligned. This alignment also highly depends on the willingness to change in an organization. With increased transparency, decision making often becomes more centralized. This centralization of decision making can be hard to accept for employees who feel they lose control over their processes. For that reason, change management is one of Hilti’s top priorities during the roll-out of the HIP project.

Nevertheless, for a large company like Hilti, it can be challenging to educate employees in separate regions and separate roles. When most employees are used to having a lot of decision power, it can be hard to convince them to lose some of this power to increase the system’s accuracy. Though, despite all this, the willingness to change under employees was high. According to Ilias El Hadji, Global Process Manager for the Global Logistics Management team, Hilti’s business culture can be seen as a reason for this. “At Hilti, change is not seen as a bad thing, because the employees know change will lead to optimized business processes”. Furthermore, Armin Küper, Vice President Manufacturing, mentions how top management was immediately engaged which confirms that the willingness to change is high in all layers of the company.
Sales & Operations Planning Core Processes

There are two different parts of the HIP project. The Sales & Operations Planning (S&OP) process can be classified into the Sales Planning and the Supply/Operations Planning. The Supply/Operations Planning is initiated after the Sales Planning has been conducted. Figure 1 and Figure 2 show the Sales Planning and Supply/Operations Planning respectively.

**Figure 1: Hilti Sales Planning**

The Sales Planning starts with a statistical forecast that is computed monthly. This forecast is based on data related to sales histories per product line. Subsequently, the local market intelligence is included to provide a demand review that adapts the statistical forecast with respect to product-specific projects/promotions. Thereafter, sales forecast integration meetings take place based on general management, sales, marketing, logistics and finance. This integration is firstly done on a business unit level and later on the market organizational level. Thus, from a low to a higher level. With this, the Marketing, Logistics and Finance Departments have integrated, agreed-upon monthly standards (Urlings, 2017).

**Figure 2: Hilti Supply / Operations Planning**
After the Sales Planning is completed, the Supply/Operations Planning starts with a capacity preview and an evaluation of scalability options for this capacity. The result of this capacity preview is a monthly capacity bandwidth per production line. Subsequently, the actual S&OP meeting takes place. The net requirements are compared to the available capacity based on required/available capacity in hours. Moreover, stock projections are made to compare with target stock levels. The results of the S&OP meeting are used to align the Master Production Scheduling (MPS) and Distribution Planning. The MPS is updated every week, where specific production amounts are determined per item. During the Distribution Planning, replenishment orders are planned but not fixed. Finally, for every actual replenishment order and subsequent deployment, decisions are made whether or not to fulfill the order, based on the net requirements calculation (Urlings, 2017).
Design Phase

Designing the Hilti Integrated Planning (HIP) project was complex and time-consuming. In particular, to achieve the quality of the required data a lot of cleaning and processing was needed. The duration of the project was on one hand based on external factors, on the other hand also on something Rüdiger Kübler, Global Head of Materials Management, calls the Hilti-challenge. At Hilti, the goal is always to design a 100% perfect solution first. In case the solution is not perfect, it is difficult to implement. On top, Hilti uses a pilot for important changes. Although this initially costs a lot of time, afterwards implementation can be fast and without hurdles. Usually, companies with a similar project tend to introduce 60 to 70 variables that can be measured to determine whether the program is working. At Hilti, 130 of these variables were created just for the first live version. Due to this, the timeline for the design phase is way longer than average. This also means that every time a measurement shows an adverse outcome during this phase, someone will investigate this. Initially, the process would take three years, but currently, it already takes six years. At the same time, the project is much bigger than the original idea, and way more improvements have been made. Meaning that also many hidden improvements happened due to the HIP project which are hard to measure.

With a super detailed design and intensive testing for the pilot version, the roll-out of the HIP project has been much easier. During the design phase, a roll-out plan was created so that the entire organization could learn and implement fast. Specific and undisputed results of the pilot lead to a trust factor among employees. With top management being immediately involved, the acceptance of the new process among employees was high. To create a successful roll-out, it was decided to first introduce the HIP project in one market in all regions. Afterward, everyone should be able to roll it out by themselves. By creating intermediate quality, forecast and security reports analysis can be made about the results of the roll-out. Herby, the quality of project forecasting, could be analysed.
Collaboration TU/e and Hilti

From the beginning, the entire program around the Hilti Integrated Planning (HIP) project was supported by the TU/e. The HIP project started with a concept phase to develop a hierarchical planning as a foundation/principal. Over a couple of years, several master students writing their thesis at Hilti, have filled gaps where Hilti missed the internal knowledge on specific topics. For Hilti, several reasons exist to work with students. One of the main reasons is to be able to hire good people afterward. Another reason is the good impulses students tend to give when they start working in a new environment. These unique views provide valuable information to established companies, this was also the case for Hilti. A third reason for Hilti is the content provided by the master theses. Often, concepts of these theses are used and implemented in the day-to-day work. The first master thesis, Wanrooij (2012), during the HIP project is a good example. This thesis was about ‘uncontrollable’ items. Before this concept was introduced, there was zero knowledge about this phenomenon. However, nowadays everyone in the planning departments understands this concept and can work with these items.

THESIS AT HILTI

At the end of his Master Operations Management and Logistics, Sindri Fridriksson came in contact with Roeland Baaijens - Project Principal at Hilti - via the European Supply Chain Forum. This contact opened the door for him to do his final master thesis at Hilti. Especially the contact with different people from different areas like marketing, sales, and supply chain spoke to his attention. His thesis aimed at providing transparency throughout the project business supply chain of Hilti. Later, this thesis, Fridriksson (2015), was implemented in HIP, and the TU/e build further on this thesis.
Results

Since the introduction of the Hilti Integrated Planning (HIP) project, several results are accomplished. The forecast bias and accuracy have improved a lot. The forecast bias used to be approximately 20 percent, though, it decreased significantly to two to three percent only since the implementation of the HIP project. The introduction of the right indicators has professionalized the complete supply chain. For example, in one of the plants, it was known on Friday whether employees had to do overtime on Saturday. In the new environment, this is already known one week beforehand. These changes increase the morale of the employee, and it makes communication easier. Furthermore, with the transparency being increased, demand deviations are better managed, and people start to work and talk more together. The HIP project has connected dots that were first operating separately. With this, sales and supply, which are the different parts of the HIP project, have more contact. The implementation of the sales forecast integration (SFI) meeting as part of the Sales Planning has led to increased communication between the various functions and increased the pipeline’s reaction time. The most significant results that have been measured are higher customer service level, lower costs, supply reliability improvements, and higher employee satisfaction.

Besides these results, there are also additional results that cannot be measured. Positive development can be seen in the inventory and service level, but on group levels, it is still hard to show this. Therefore, some results still show potential to further improve. An important achievement is a monthly rhythm in the Sales & Operations Planning (S&OP). There are monthly meetings where every attendee has to deliver their forecast. This meeting is consolidated and integrated into the supply chain leading to results as well.

One of the plant managers calls the HIP project the flywheel for continuous improvement. This continuous improvement might be the most critical aspect of the HIP project. Until today, everything that is somewhat part of the HIP project is evaluated and improved. This is a process that still continues driven by the mindset to create a near-optimal process where nothing is left untouched. Above all, as Roeland Baaijens mentions, it is crucial that people still understand the system. If people do not understand it, they will not trust it. Therefore, transparency which leads to trust is more important than a 100% perfect system at Hilti.
Future of The HIP Project

At this moment, the HIP project is all but finished. So far, great results have been accomplished, but still, many plans exist for the future. It is important to stabilize the process, determine what is needed, remove the over-complex system, and make it understandable. Also, the distribution planning still needs to be included in the HIP project. The overall goal is to integrate the full supply chain. Currently, the level of integration between sales and supply has already increased tremendously. But, as one can see, there is still more potential, with using the data for multiple purposes.

Another important plan for the future is to include outside suppliers within the supply chain. Introducing these suppliers to the supply chain will increase transparency even more. However, doing this can be quite challenging since these outside suppliers might feel like they give away sensitive information. Some supplier’s sales heavily rely on Hilti. For these suppliers, transparency can be valuable. Though, on the other hand, for suppliers where Hilti concludes only a small percentage of the total revenue, the process of including the HIP project will be a challenge.
Dealing with the Corona-crisis

In the past 20 years, the world has seen multiple economic crises. Think, for example, about the dot-com bubble in 2000 or the financial crisis during 2008. Organizations have to make sure that they are prepared during this kind of extraordinary situations in order to survive. The same applies to the current COVID-19 crisis which brought a lot of uncertainty. However, when you ask Hilti if they were prepared to the COVID-19 situation, the answer is very clear and unambiguous: they were not specifically prepared for such a pandemic. This lack of preparation was mainly because the choice has been made to build a resilient supply chain able to deal with many different unexpected challenges. Nevertheless, when you ask Roeland Baaijens if they were able to react quickly when something happens, the answer was “yes”. The robust Sales & Operations Planning (S&OP) process as implemented from the Hilti Integrated Planning (HIP) project can ensure to survive in difficult times.

Figure 3: Disruptive sales drop in April/May - recovery since June: In line with plan

Figure 3 shows the disruptive sales drop in April and May due to COVID-19. Furthermore, it shows the three phases Hilti experienced around this period: supply crisis, demand crisis and recovery. In February the supply crisis started which transitioned into a demand crisis as COVID-19 was developing around the world. During the supply crisis, the goal for Hilti was to ensure high customer availability. They informed their stakeholders, increased selective inventory and
exceptionally airfreight. Subsequently, when the demand-crisis was evolving, a global working hypothesis was defined to get everyone on the same page. The operation called “hard brake” was put into operation meaning that Hilti prepared for a significant drop in their sales. Due to the S&OP, Hilti was able to react immediately at a central level. The frequency of the SO&P was adapted from monthly to weekly level since maintaining the monthly frequency would lead to lagging decisions. These SO&P decisions were then implemented at the decentral level. Besides, they were steering actively and had close contact with all their stakeholders. The result was directly visible in a good availability and a controlled inventory. It was clear to Hilti that they had to be ready for the next phase, namely the recovery. Within this phase, the demand of the complete supply chain is still monitored very closely. Depending on the phase a specific country is in, measures are taken to get the operations back to “normal”.

All in all, Hilti was able to intervene centrally, subsequently change the frequency at the decentral level, and manage several other variables to limit the damage of the pandemic. These three factors are all due to the implemented S&OP and would not be possible before. With the S&OP in place, Roeland Baaijens has great confidence in maintaining the business and surviving any possible extraordinary situation in the future.
References

COLOFON

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Editorial
Author: M.E. Crooymans, Eindhoven University of Technology

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