

CASE STUDY SUPPLY CHAIN FINANCE: IT PLATFORM FOR SMES

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Abstract

The significance of IT platforms are that they facilitate information, communication and new technologies and allow companies to improve efficiency and optimise their supply chain processes. By definition this implies that an IT platform is a cloud-based software which is not installed on a company's server but is accessible via an Internet browser by using electronic devices.

In this article a literature review and a field research (e.g. a case study) are carried out to investigate the role of a 'real' IT-platform connecting companies in the supply chain, and to define Supply Chain Finance metrics in terms of the improvement of liquidity and efficiency. In alignment with the outcome of the literature review a case is studied and analysed for the Heering-Holland company as an OEM manufacturer in the supply chain of conditioned poultry transport solutions using the IT platform of TradeCloud.

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Key words: IT platform, ERP system, supply chain, working capital, new business models, artificial intelligence, machine learning, big data, digital competencies, supply chain finance, lean manufacturing

1. Introduction

This case study investigates how a real existing company (Heering-Holland, 2020) manages its supply chain by using an IT Platform (Tradecloud, 2020) to perform better in some supply chain finance metrics.

Our research question is: *"What is the impact of an IT platform (that connects ERP systems of different companies in the supply chain) when attempting to improve the performance of the supply chain in terms of supply chain finance metrics."*

Heering-Holland's main office is situated in Vaassen in the Netherlands. The product portfolio consists of transport solutions for conditioned poultry transport for trucks and vans. Heering-Holland's supply chain is international (Heering-Holland, 2020).

Tradecloud is an IT platform (Tradecloud, 2020) that provides the following services to its clients in their supply chain:

- Zero touch handling (no paper, faxes, emails and/or MS Excel files)
- Real time insight (shorter lead times, less mistakes, and higher profit margins)

- Communication in contexts (in case of possible disputes the parties are looking to the same information)

In this paper we will use the well-known definitions of Supply Chain Management (SCM) by Van Hoek et al. (2011) and Logistics Management (CSCMP, 2020), to summarise: SCM implies the relationship between the flows of goods & services, the information flows and the financial flows (Figure 1). In this research the role of the focal company (Hearing-Holland) is defined as a dominant company in the supply chain (Lambert, Cooper, & Pagh, 1998).

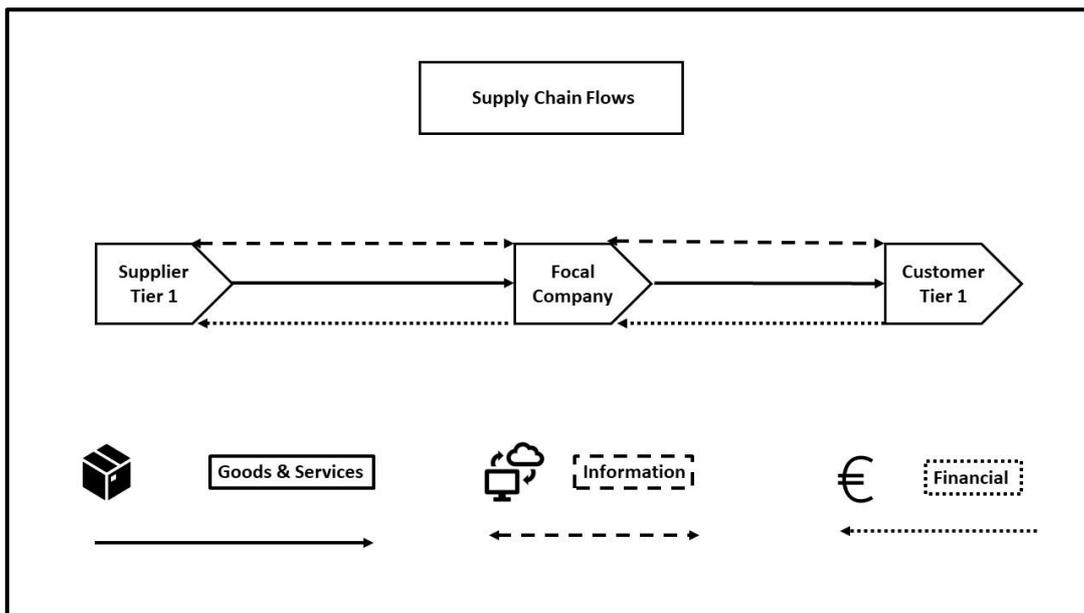


Figure 1 Supply Chain of the focal company (developed by the authors)

Supply Chain Finance (SCF) in this article is defined from a more general point of view (Steeman, 2014), no link will be made to definitions in which the so-called supply chain finance instruments like reverse factoring and dynamic discounting are used (European Banking Association, 2014).

'Financial arrangements in the form of debt, equity or financial contracts used in collaboration by at least two supply chain partners and facilitated by the focal company with the aim to improve the overall financial performance and mitigate the overall risks of the supply chain'

Another topic in this research is about Integrated Business Planning (IBP), IBP is an integrated plan of Logistics, Finance and Marketing in which 3 elements come together (Weenk, 2019):

- Order to Cash (O2C)
- Purchase to Pay (P2P)
- Demand to Supply (D2S)

The IBP-concept (figure 2) is visualised by Capgemini (Börner & Kaiser, 2016) in 3 main activities such

as Supply plan, Demand plan and Financial Plan, which are linked to Production & Logistics, Inventory Management, Sales & Marketing Management, Product Life Cycle Management and Financial Management.

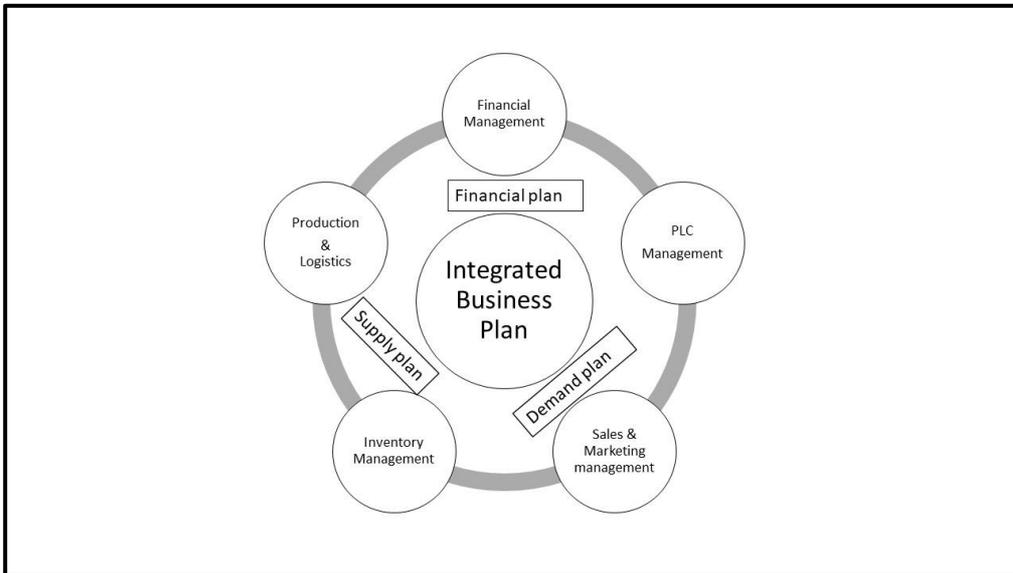


Figure 2 Visualisation IBP concept, based on Börner and Kaiser (2016)

For other core concepts in this article the following basic literature is used: ERP (Caiola & O'Sullivan, 2016), IT Platform (Ruggieri, R., Savastano, M., Scalingi, A., Bala, D., and D'Ascenzo, F., 2018), Operations management (Slack, Brandon-Jones, & Johnston, 2016), and Finance (Brealy, Brealy, Myers, & Allen, 2020) (Hillier, Clacher, Ross, Westerfield, & Bradford, 2011).

2. Methodology

In this paper two types of research are used:

- Literature review
- Case study method (Dul & Hak, 2008)

The literature review was carried out in the field of SCM, SCF, Finance, Logistics, Operations Management, ERP and IT platforms.

For the case study we used Heering-Holland as a focal company in the supply chain of 'the development of innovative and sustainable transport solutions for the agricultural sector' (Heering-Holland, 2020) and a service provider of IT Platforms called Tradecloud (Tradecloud, 2020).

Both companies were interviewed via a semi-structured interview technique (Saunders, Lewis, & Thornhill, 2003), also a company visit was made to observe the production process of the focal company. So the case study was covering the client perspective (Heering Holland) and the IT platform provider perspective (Tradecloud).

3. Literature review

Supply chain finance (SCF) is based on four pillars (Jansen J. H., Year):

- I. Supply Chain Management (SCM)
 - a. Purchase
 - b. Sales
 - c. Inventories
- II. Finance & Control
 - a. Working Capital (e.g. Operational Net Working Capital = ONWC)
 - b. Processes
 - i. O2C
 - ii. P2P
 - c. Risk mitigation
- III. IT
 - a. Enterprise Resource Planning system (ERP)
 - b. Electronic Data Interchange (EDI) / IT Platform / Blockchain
- IV. Bankers / Financiers (SCF Instruments)
 - a. Reverse factoring
 - b. Dynamic discounting
 - c. Factoring
 - d. Crop financing
 - e. Inventory financing
 - f. Equipment financing

We neglected in this research the IV section, which is about the role of supply chain finance instruments from the financial sector. This literature review focuses on discussion of adopting digitalisation by production companies or original equipment manufacturers (OEMs) in supply chains.

For this case study an adjusted conceptual model (Jansen J. , 2018) was developed (figure 3), in which the business activities such as Sales, Production and Purchase are represented in the left part, internal processes (using ERP) are in the middle, the outcome for the company (liquidity, added value and risk mitigation) is on the right-hand side.

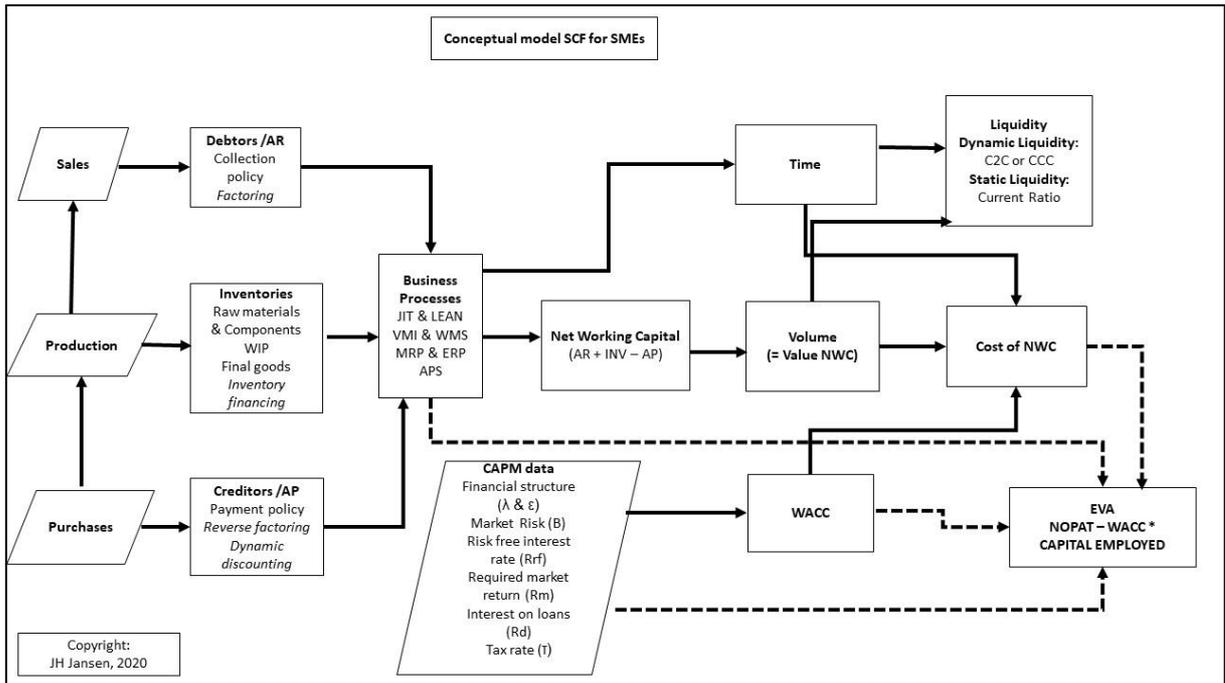


Figure 3 Conceptual model Supply Chain Finance for SMEs (Jansen J. , 2018)

An ERP system has the following functionalities (Caiola & O'Sullivan, 2016): Marketing & Sales, Purchases, Inventory, Engineering & Manufacturing (Incl. BOM), Shop Floor, Scheduling, Administration, Financials, Executive Information System (Incl. BI), and Communication.

An ERP system is defined as follows: 'A system that integrates all aspects of an organisation's activities – such as accounting, finance, marketing, human resources, manufacturing, inventory management – into one system' (Romney, M.B. & Steinbart, P.J., 2015). ERP systems became popular in the 90's. It is a well-known fact that production companies using ERP systems significantly benefit from digitalisation of business processes and the use of information stored in databases of ERP systems that is available at any moment for fulfilment of daily operations, generating demand forecasts, production planning, data analysis, analysis of financial results, problem solving and decision making.

The current technological development is forcing many companies to use not only ERP systems, but also IT platforms connecting companies' ERP systems and enabling collaboration in the "cloud" environment through the Internet. Specifically, this literature review is about application of ERP systems, IT platforms and new technologies that can provide an innovative way for companies in a supply chain to optimise their business processes and working capital as well as to increase their competitive advantages on the market.

Use of IT platforms is a next step in the process of digitalisation. The recent studies define these platforms as follows: 'Digital platforms is a collective term associated with technologies such as mobile devices and applications, cloud computing, in-memory technologies and social media' (Ruggieri, R., Savastano, M., Scalingi, A., Bala, D., and D'Ascenzo, F., 2018). There are several types of IT platforms, some of them are referred as multi-sided platforms. In literature a multi-sided platform is described as

an aggregation platform bringing together producers and consumers and acting as an intermediary (Ruggieri, R., Savastano, M., Scalingi, A., Bala, D., and D'Ascenzo, F., 2018).

4. Case study: Heering-Holland and TradeCloud

Based on the literature review, the case study was carried out in terms of the construction of semi-structured interviews with the companies, as well with observations on the shop floor of Heering-Holland.

Here is some additional information about the two companies in this case study:

Heering-Holland

With the expertise of egg and day-old chick transport, Heering offers you climate-controlled transport technologies to optimize your transport performance from hatchery to farm. Our carriers are proven under extreme climate and road conditions. They are specially designed to maintain an optimized environment, to ensure eggs and birds arrive in the same condition as loaded. (Heering-Holland, 2020)

Heering-Holland's manufacturing policy can be characterised like an OEM that uses ATO (Assemble to Order) (Weele van, 2018).

TradeCloud

Tradecloud is the leading supply chain platform for manufacturing & wholesale companies. Customers rely on Tradecloud to make their global supply chain more predictable, automate operational processes and focus on exceptions. The fast growing network connects thousands of B2B buyers & sellers who collaborate real time on forecasts, orders & shipments to increase margins and reduce waste.

Unlike traditional software, implementation times, subscription costs and supplier onboarding is fast and simple. Connected buyers & suppliers include Eriks, Nooteboom, Quooker, Solar, Fabory, Bosch, Gazelle, Agrifac, Intersafe, and many more (Tradecloud, 2020).

The TradeCloud platform used in supply chains helps connect companies' ERP systems in the "cloud" with the ultimate goal to automate and improve business processes like, for example, order handling and delivery processes (TradeCloud, Supply chain integration in the cloud, 2019). This platform can be categorised as a multi-sided platform.

Nowadays, production companies actively integrate in business processes management new digital technologies like "cloud" technologies, artificial intelligence (AI), big data, blockchain, augmented reality (AR), virtual reality (VR), Internet of things (IoT), etc. Scientific research in the field of innovation trends for production companies reveals the importance of AI, big data, AR and VR for product design and

applicability of blockchain technologies for production cost models (Sousa, M.J., Cruz, R., Rocha, A. and Sousa, M., 2019).

IT platforms also intend to apply new technologies like AI, machine learning and analytics tools for optimisation of business processes and analysis of data. Big data can be used, for example, for suppliers' performance analytics; AI is applicable for Supplier Risk Identification by keeping records and the analysing of suppliers' risk factors (Sammalkorpi, 2021).

The definition of IT platforms implies that an IT platform is a cloud-based software which is not installed on a company's server but is accessible via an Internet browser by using electronic devices. The use of cloud-based servers means the user is using a pooled, centralised server which is hosted over a network and accessible by multiple users. As shown in figure 4 a focal company is connected to its suppliers and customers through the TradeCloud IT platform. Figure 4 also shows information, goods and money flows in the supply chain. TradeCloud has a direct impact on the information and goods flows and also influences the working capital and Cash-to-cash cycle of the focal company. In the case study, the focal company is represented by Heering-Holland manufacturing company. One of the most important trends for supply chains is demand-driven purchases (TradeCloud, Supply chain integration in the cloud, 2019). In general IT platforms can significantly improve purchase and sales business processes by connecting ERP systems of companies within a supply chain.

The TradeCloud IT platform is the multi-sided platform which is mainly used by manufacturing or wholesale companies to automate Purchases-to-Pay and Order-to-Cash processes in their supply chains. There are many advantages of using TradeCloud (Tradecloud, 2020), such as:

- self-managing supply chain;
- reduction of orders handling costs ("zero touch order handling");
- manufacturing lead time and delivery time reduction;
- errors reduction;
- supply chain integration.

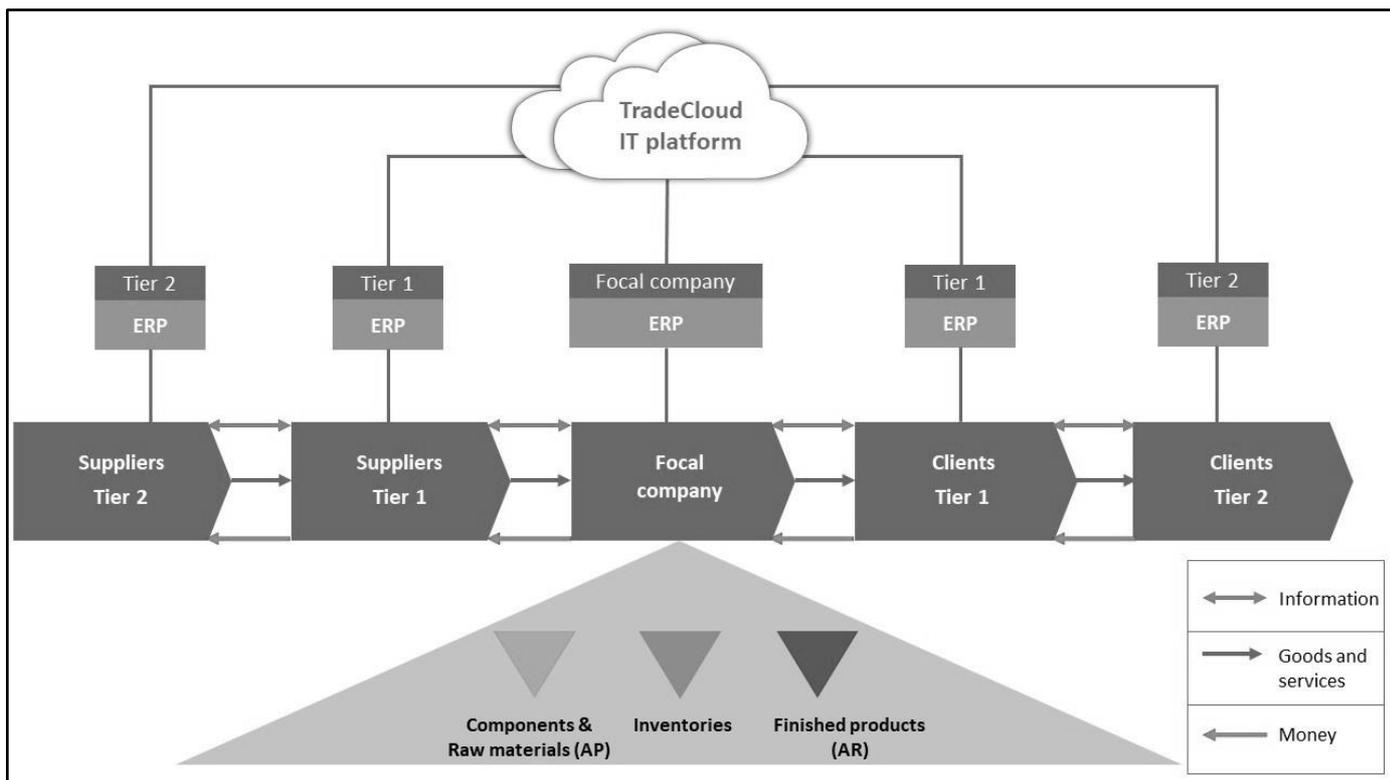


Figure 4 Integration of a supply chain through TradeCloud (made by authors)

As shown in figure 4, IT platforms, in particular TradeCloud, can be used for items, orders, invoices and deliveries management, for sharing information with suppliers (or customers), for communication and data analytics. Figure 5 shows the connection of the focal company Heering with its suppliers through the TradeCloud platform. Figure 6 is similar to Figure 5 and shows connection of the focal company Heering with its customers.

TradeCloud provides workflow actionable insights enabling real-time comparison of dates, quantities, prices etc. and automatic approval in case of small differences. In this case the machine learning technology is applied which allows fully automatic work flows for Purchase-to-Pay or Order-to-Cash business processes. If there is 2% difference in prices or a delay of 1 day in supply of products, the work flow will not be interrupted and the processes of buying or selling will be run smoothly by this IT platform. It means, if all things are going well, the work flow will automatically adjust itself (so we have now a self-managing supply chain).

The big data technology is also used for classification of products in terms of price changes. All products in supply chain can be divided into groups by how often or how much prices change or by inventory availability. This classification is applicable for the "short tail" of inventory as well as for the "long tail" of inventory. Furthermore, classification of products is used for monitoring suppliers' performance or for estimation of delays in a supply chain.

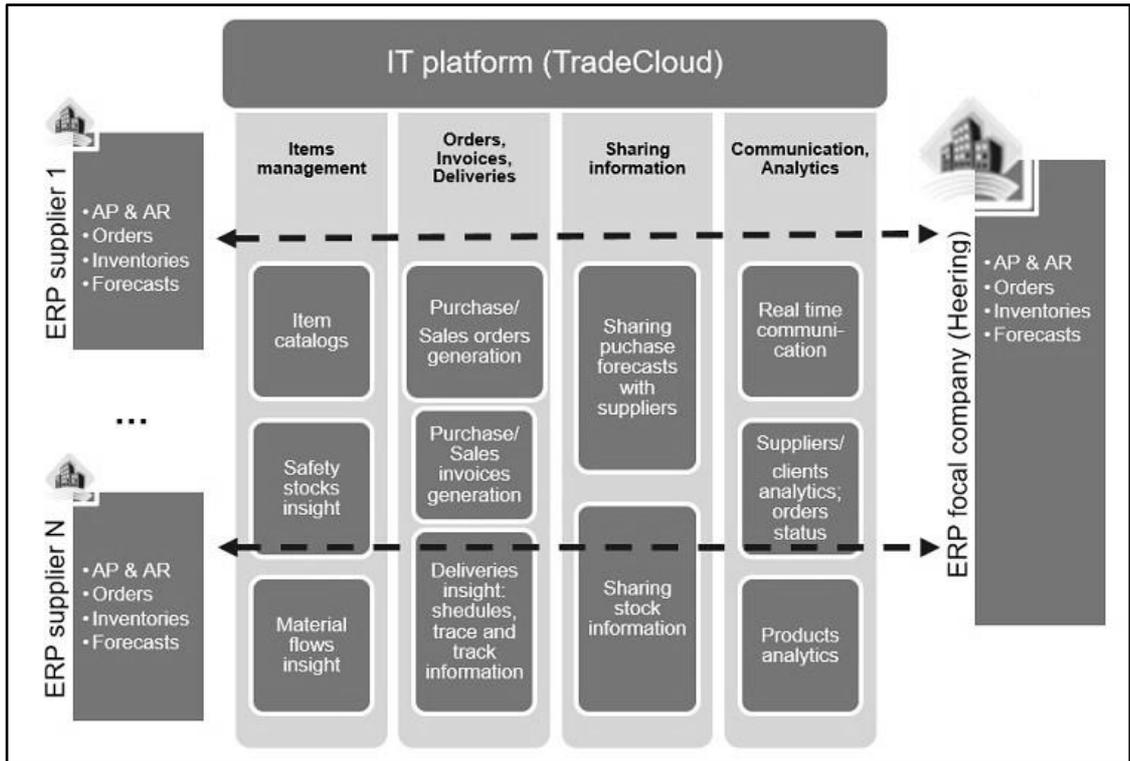


Figure 5 Functionalities of TradeCloud and connection of the focal company Heering with its suppliers through the TradeCloud platform (made by authors)

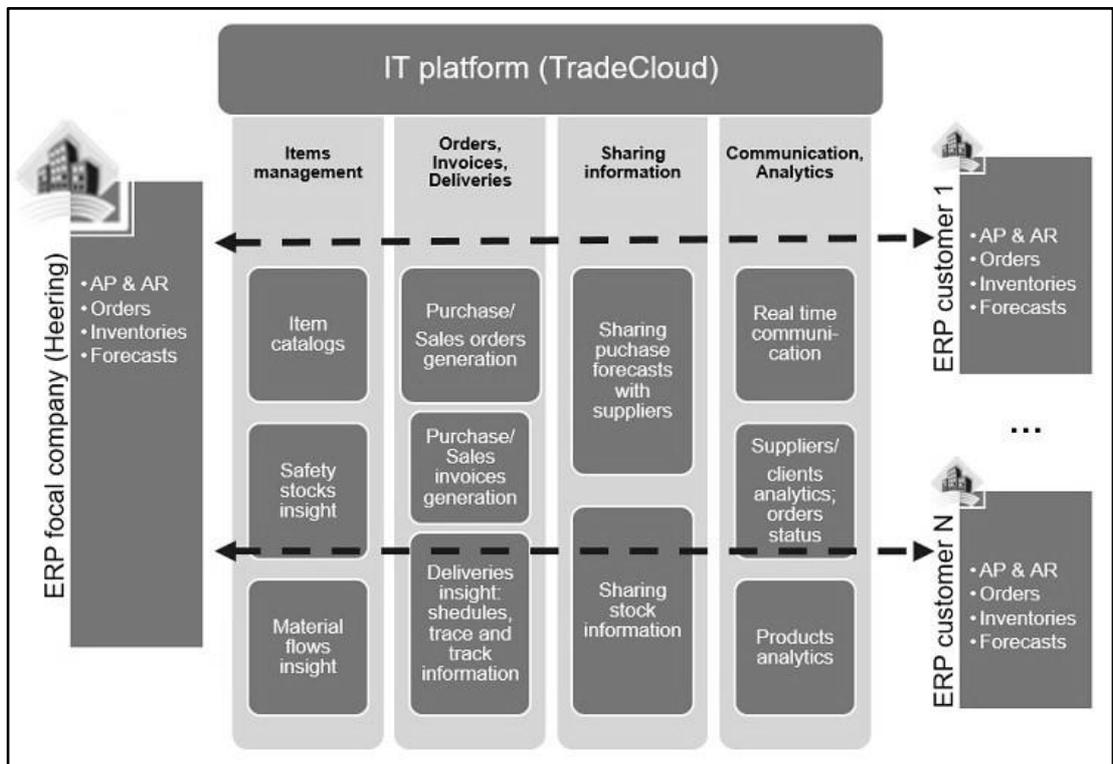


Figure 6 Functionalities of TradeCloud and connection of the focal company Heering with its customers through the TradeCloud platform (made by authors)

Automatic orders handling is enabled through integration of TradeCloud with ERP systems of companies. A purchase order from the customer is forwarded directly via TradeCloud to ERP, where the sales order is then made. If the stock is sufficient, the purchase order confirmation is sent automatically to the customer. Insufficient stock is immediately communicated to a sales employee so that he or she can find solutions to solve the problem.

Data analytics in TradeCloud is represented by a number of reports as follows (TradeCloud, 2019):

- Overall supply chain performance
- Supplier reliability metrics (Ordered vs. Delivered, Confirmed vs. Delivered)

Added value of an automated workflow for a machine manufacturer (SCF metrics)

- Supplier reliability was increased from 82 to 97%, a 15% increase.
- 50% time saved on employees doing 'unnecessary work'.
- A saving of 2 FTE's, meaning €150.000 euros in direct savings.
- Approximately €500.000 in indirect savings, since the company had to carry less stock, there were less mistakes by employees and there was less risk. This could be even higher, up to 1,5 million euros in indirect savings, due to more reliable production processes. A happy factory flow means less errors.
- A return on investment (ROI)³ in 12 months. The AI solution is bringing 10 times more value than it costs.

Source: AI case study 5: Workflow automation with TradeCloud One (TradeCloud, AI case study 5, 2021)

5. Conclusion and Discussion

The case study on the use of IT platforms (e.g. TradeCloud) in supply chains showed that a successful implementation of IT platforms in supply chains benefits various stakeholders in terms of automation of business processes and continuous improvements of supply chain management and operational net working capital management. The use of IT platforms implies an increase in efficiency and agility of business processes by the reduction of manufacturing lead time and delivery time of products.

IT platforms also cause organisation changes in companies adopting digital collaboration in supply chains and development of new business models based on innovations and new technologies. Organisation changes in this case involve changes of business processes through their automation to a greater extent and changes of employees' competences like rethinking of existing business processes as well as understanding and ability to use new digital technologies on the operational level. Development of new business models for companies in a supply chain involves considering opportunities

³ ROI is mixed up with Pay Back Period in the text of the website of TradeCloud, so the Pay Back Period of this investment is 12 months.

of the use of IT platforms, better collaboration in the cloud and broader data analytics. All positive impacts of IT platforms on supply chains can be divided into two groups:

- I. Financial in terms of impact on working capital:
 - a. order processing costs reduction through automation of Purchase-to-pay and Order-to-cash processes;
 - b. lower inventory costs due to better items availability management;
 - c. better Accounts payable and Accounts receivable accuracy;
 - d. shorter Cash-to-Cash Cycle (C2C) of the focal company.

The goal of many companies is to shorten C2C cycle as well as to keep balance between Accounts Receivable and Accounts Payable. If Accounts Payable higher than Accounts Receivable, the company can experience delays in payments to suppliers and consequently become less trustworthy for suppliers.

- II. Non-financial in terms of impact on:
 - a. supply chain integration;
 - b. optimisation of physical, financial and information flows in supply chain;
 - c. broader use of companies' ERP systems;
 - d. better management of demand driven supply chain;
 - e. higher customer satisfaction due to reducing delivery time;
 - f. supplier and customer relationship improvement due to faster and more convenient communication and information sharing;
 - g. opportunities of supplier performance assessment and benchmark;
 - h. opportunities of adopting new technologies like AI, machine learning, big data etc.
 - i. opportunities of driving organisation changes towards innovations and new business models;
 - j. facilitating companies KPIs with additional data regarding supply chain performance.

This case study describes only one focal company using the IT platform for a better performing supply chain, more research has to be carried out to draw more general conclusions when using this sort of (non-financial) IT platforms.

Glossary of Financial terms

(Net) Working Capital	Current Assets – Current liabilities (Brealy, Brealy, Myers, & Allen, 2020)
Operational Net Working Capital	ONWC = Inventories + Account Receivables – Account Payables (Kratz, 2016)
EVA	NOPAT – WACC * Capital employed (Brealy, Brealy, Myers, & Allen, 2020)
NOPAT	Net Operating Profit after Taxes
WACC	$= \epsilon * R_e + \lambda * R_D * (1 - \tau)$ (Brealy, Brealy, Myers, & Allen, 2020)
R_E	Return on Equity: $R_E = R_{RF} + \beta * (R_M - R_{RF})$
R_D	Interest rate (Debts)
R_M	Required market return on portfolios
R_{RF}	Risk free interest rate (on State bonds)
β	Financial Beta: Measure of market risk (Brealy, Brealy, Myers, & Allen, 2020)
τ	Corporate tax rate
Capital Employed	Total Assets – Current Liabilities = Equity + Non-current liabilities
Liquidity	The ability to sell an asset on short notice at close to the market price (Brealy, Brealy, Myers, & Allen, 2020)
Current Ratio	Current Assets ÷ Current Liabilities
Quick Ratio	{Current Assets – Inventories} ÷ Current Liabilities
DSO or Receivables turnover	{Account Receivables ÷ Revenues} * 365 days
DIO or Inventory period	{Inventories ÷ COGS} * 365 days
DPO or Payables turnover	{Account Payables ÷ COGS} * 365 days
C2C or CCC	= DIO + DSO - DPO

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