

# Services 4.0 in and along the Financial Supply Chain

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The digitalization of production engineering, known as “Industry 4.0”, has a direct impact on the Supply Chain. When financial assets are the resources of this value chain, this is called - together with its processes and products - Financial Supply Chain (FSC). Thus the question arises whether progress

by Industry 4.0 does have any impact on central services of the FSC and therefore on the banking sector, concretely the Corporate Banking. The networking and collaboration between corporates and their service providers, in this case financial service providers and banks, requires innovation and further development of service concepts in order to accelerate adaptability and to increase efficiency of financial business in global competition.

Taking the example of conversion within and along the FSC, the article shows demands and changes of a service in order to meet the requirements of digital progress. The authors use the concept of a syntactic, semantic and pragmatic view on information and show that services within the value chains must fulfill this view.

## **1. Features of Services 4.0**

Further development of industrial facilities and processes based on the concepts of Industry 4.0 comprises increased networking of machines, products, people and IT systems in order to accelerate and improve data exchange between all entities involved (Spath et al. 2013, p. 22). Efficient and flexible production facilities are being discussed, which are informed about the course of the product process by the products to be manufactured (Lasi et al. 2014 p. 261). This idea of flexibly configurable production facilities constantly targeting a defined purpose<sup>1</sup> should be given more weight in the IT, too. The analogy to in-

dustrial production is maintained specifically by the term “Services 4.0”. Knowledge about specific domains where Services 4.0 are applied in, give them a pragmatic dimension<sup>2</sup>. Their impact on the design of IT architectures is shown in this article using the example of intelligent conversion. Standardization efforts often provide the basis for communication between different entities. Those efforts can be found in the area of Industry 4.0 (Quack 2015, p. 30f) as well as in the FSC (e.g. ISO 20022). Should this trend to standardization continue, “simple” converters will lose their reason to exist. Instead of them, intelligent

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<sup>1</sup> The design of services in appropriate granularity from the business perspective shall also increase reusability.

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<sup>2</sup> The dimension mentioned here as pragmatic as well as the demand for context reference can be found in further publications (see (Böhmman/Leimeister/Möslein 2014, p. 83f).

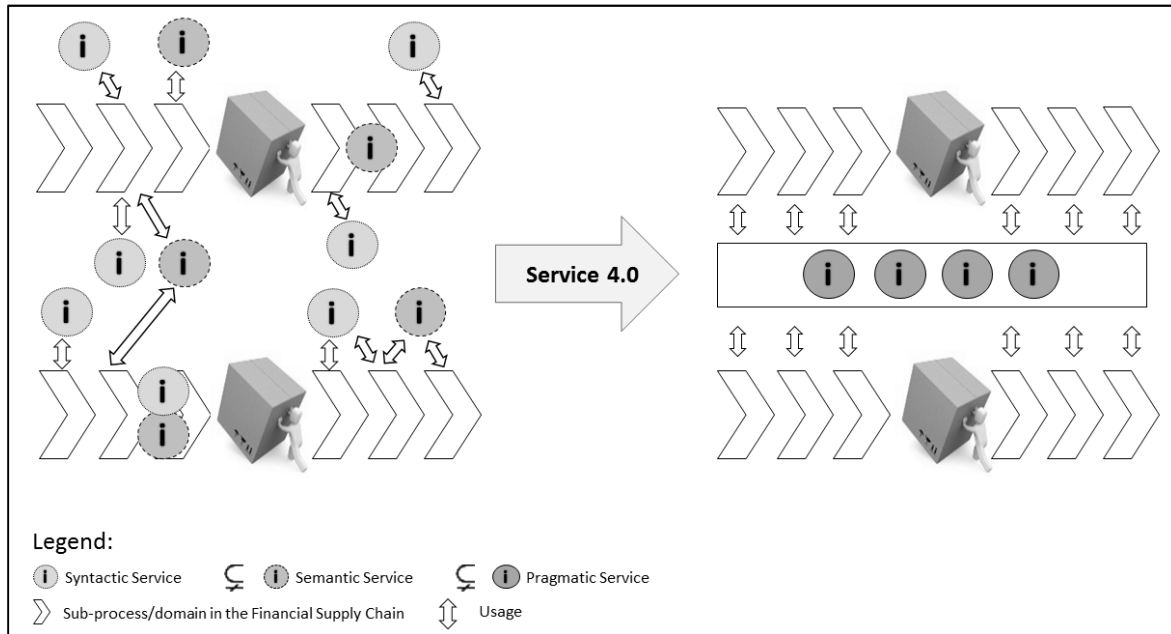


Figure 1: Evolution of services

converters which recognize context and objective of the corresponding business process in order to generate relevant information from different data, are required.

Development of conversion to become a Service 4.0

The FSC consists of processes for the “collection of financial assets” of commercial transactions (Krabichler 2010, p. 2). This means that in the FSC there is the “financial flow” accompanying the physical Supply Chain (Franke et al. 2005).

The more flexible production techniques announced with the 4<sup>th</sup> industrial revolution, which shall decrease the lot size (Lase et al. 2014, p. 261), have an impact on the FSC, e.g. in the area of quantification, financing and investment<sup>3</sup>.

Business processes of the FSC are implemented fulfilling the combination of relevant

services. One service carries out one or more process steps, processing the designated technical task (Melzer et al. 2010, p. 36ff). Some tasks, like e.g. authentication and checking of access rights, are common functions and should be provided as services, since they are to be fulfilled in several business processes. Since conversion is a common function as well, converters are to be implemented as services, too.

The term “converter” usually means software programs that are able to “translate” one data format into another format. Simple converters operate on data. Data means an amount of signs which follows a certain structure, the so called syntax. More advanced converters are able to interpret the terms encoded in the amount of signs mentioned, this means they dominate the corresponding semantics.

Intelligent converters complete the next systematic development and are able to gener-

<sup>3</sup> Individual production to order instead of mass production with inventories leads to faster goods turnover, reduced capital commitment and therefore to new financial structures.

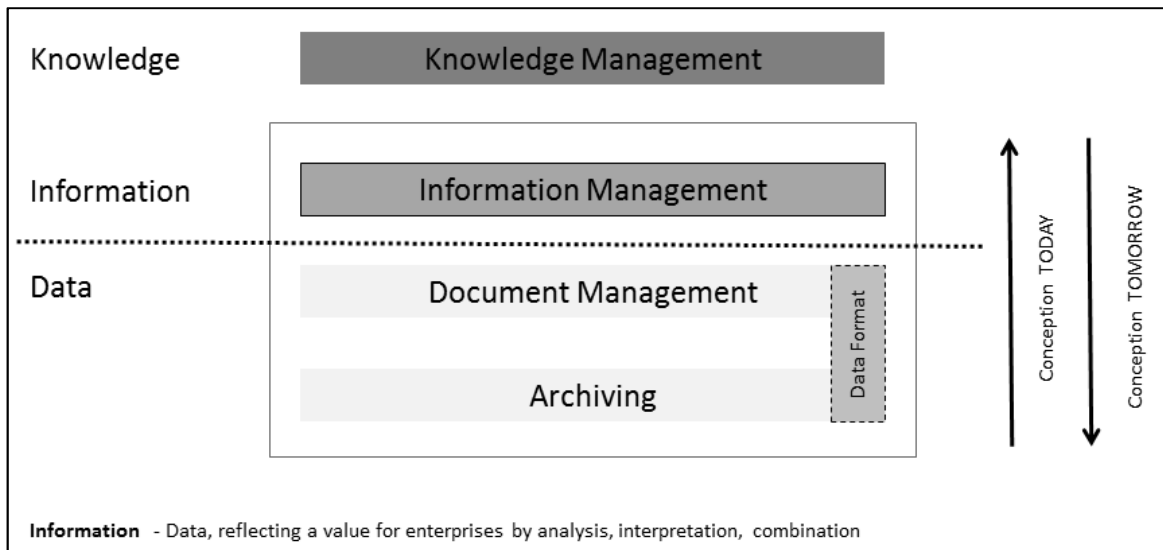


Figure 2: Contribution of conversion for generating knowledge

ate information<sup>4</sup> from the meaning of terms. Besides their knowledge of syntax and semantics, they understand the contexts and objectives (of processes). Within this context, data represent in fact useful information. Therefore, converters operate on a pragmatic level (see figure 1).

## 2. Application of intelligent conversion solutions for the FSC

At the moment, conversion activities form a considerable part of the processing of financial flows.

In the Corporate Banking of a bank, for example, more than 15 conversions are necessary<sup>5</sup> to generate the different data formats and to transform individual data into the target format necessary for the customer. Facing this variety of different conversion solutions, a conversion service with a comprehensive knowledge of different data formats is desirable.

The impulses of intelligent converters towards the design of IT architectures go even one step further than mentioned above, since they operate on an information level and provide much more than the mere mapping of data fields. In general, data and information as well as the knowledge about data and information are fragmented. They are spread in departments, IT systems and individual employees. Outside of the corresponding process domain where it is processed, data is possibly existent without informative nature and seems to be of no relevance for other domains. However, if information is required in all domains, in the worst case it is necessary to collect and save it separately. As a consequence, redundancies arise which have to be condensed to information using analytical methods (bottom-up). Intelligent converters allow cross-domain (virtual) centralization of data fragments as information. Thus they create the basis for structured and efficient management and development of the information basis (see figure 2).

Information and the knowledge about information form a base for the various business

<sup>4</sup> „Information is purposeful knowledge which determines action.“ (Heinrich/Ried/Stelzer 2014, p. 15)

<sup>5</sup> Internal information of a R&L AG customer

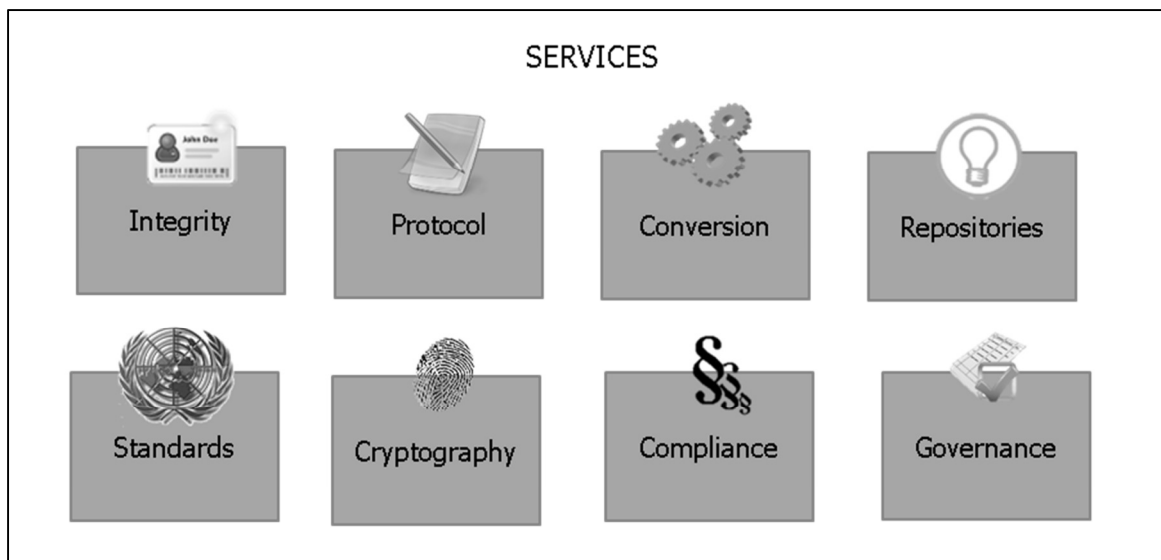


Figure 3: Selected services for the FSC

processes in companies and must be available for them efficiently. Therefore, intelligent converters are central services, which have an aggregate as well as a supply function.

The positioning of the supply function in such a central service relieves business processes from collecting and transforming all information within the process flow. Therefore, it has an impact on process design and process documentation. The reduction of dependencies on diverse surrounding systems, reduced complexity as well as more transparency may have a positive effect regarding flexibility.

### 3. Summary and result

These services provide various benefits for the users. The centralization of conversions leads to economies of scale of transactions and avoids the implementation, operation and maintenance of redundant solutions. At the same time, organizational and operational control are optimized. Interestingly, intelligent converters give pragmatic answers when information comes into the FSC for the first time. Thus, earlier than in other approaches status information for the business

monitoring can be generated and contents aggregated, e.g. for liquidity management.

On the other hand, redundancies of data in data sinks can be avoided. A superordinate pragmatic process-oriented repository knows about validity of terms and its contents. Initiatives such as e. g. ISO 20022 can transport added value and benefit into the infrastructure and into business.

### 4. Banks as drivers of universal Services 4.0

Pragmatic determines the domain of a service. Following this premise, R&L AG has identified more services next to intelligent conversion (see figure 3) which can enrich the FSC's of companies. Banks and financial service providers are direct partners, customers and suppliers along the FSC as well as driver of standards and standardizations in the financial area. Being global players, they are predestined to provide the corporates with these added values, e. g. in the form of extensive repositories or directly as service. This transparency and quality of information can be used bilaterally: working capital management, liquidity management,

payment transactions or credit insurance and granting of credit are examples of single processes of the FSC which benefit.

## 5. Literature

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