In-Memory-Computing

for the Liquidity Risk Management of Financial Service Providers

Bachelorarbeit

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Contents

1. Introduction

The global financial crisis in the late-2000s revealed deficiencies in financial regulation and demonstrated the risks that banks face today [1]. Especially liquidity risk management has been underestimated before the financial crisis due to omission in the Basel II accord [2]. Since then, new regulations have been introduced. The Basel III accord strengthens the principles and standards for measurement and management of liquidity risk[3].

Financial service providers process millions of transactional and analytical data every day. Increasingly detailed data requirements, e.g. cash flow analyses, create greater data volumes. Greater data volumes in turn generate longer processing times. The computing processes of current software solutions, i.e. traditional data warehouse architectures, take up periods of hours and days. Hence analyses results are decelerated. Modern in-memory computing makes it possible to reduce processing and computing time significantly.

The objective of this thesis is the evaluation of in-memory computing in liquidity risk management by contrasting strengths and opportunities with weaknesses and threats, which results in a SWOT matrix. First of all, theoretical principles are introduced. Exemplarily, an in-memory solution for liquidity risk management is introduced briefly. Afterwards, the SWOT analysis is performed and a critical appraisal considers the key findings in a retrospective view. Finally, the content of the thesis is summarized and an outlook is given.

[1] cf. Cornett, M. et al. (2011), p. 1
[2] cf. Duttweiler, R. (2008), p. 27
[3] cf. Moshirian, F. (2012), p. 2

6. Summary and outlook

Liquidity risk management is of significant importance in order to keep a financial service provider's position in the market stabilized. The performance of information technology is important for the quality of risk management. In-memory computing means processing massive amounts of data in the main memory of a server. It is a technology which became realizable due to advances in hardware and software. A key factor is column storage in databases. In-memory computing in liquidity risk management for financial service providers was evaluated by performing a SWOT analysis. The criteria which were considered are performance, reasonableness and consistency. Strengths and weaknesses were derived. The key findings were appraised critically.

The derived strengths are superior risk management through real-time supervision, processing high volumes of data with cash flow orientation, satisfaction of regulatory requirements on demand and cash flow calculation in highest level of detail. Opportunities are possibility of preparing future strategies and reduction of the liquidity buffer. With regard to the considered criteria, in-memory computing in liquidity risk management can create competitive advantages with performance issues e.g. processing time and computation rate. Furthermore it is reasonable, i. e. it addresses the challenges in liquidity risk management, e.g. the compliance with new liquidity rules. The third criterion evaluated the consistency which is a qualitative issue of liquidity risk management systems. Here, weaknesses and threats were detected. Delayed data delivery from subsystems, periodic loads and inconsistency between operational systems can affect the quality and impair the effect of intraday liquidity risk management. The classic problems of data quality persist. In-memory solutions such as the introduced solution of SAP need to be integrated into the overall IT architecture. Otherwise strengths and opportunities cannot be exploited.

In the light of Basel III and the new requirements, hardly any financial service provider can forego to redesign the IT architecture of liquidity risk management systems. In-memory computing enables to process and make ad hoc use of the data volumes first of all, but if it is really necessary to do that remains to be

investigated. Eventually the implementation of an in-memory computing solution such as SAP HANA LRM needs to be economically reasonable. At this point in time they are no empirical values available.

Financial service providers as well as other enterprises will have to determine individually with regard to their requirements whether the benefits of in-memory computing outweigh the costs. For liquidity risk management it is definitely worth and advisable to look into implementing an in-memory solution. Therefore, further research is required that should include cost-benefit-analyses.