

## NRWC Abstract

### Fashion Retail Master Data Model and Business Development

Harald Hovmøller, Torben Tambo

To navigate and develop the retail business it should be expected that a consistent insight in the data of the business would be of strong importance. Insight in retail data includes a persistent and sufficient abstraction of the operating model into the logical model of the data generated by the business. Much too often retail data models are at risk of become obscure when data models no longer can follow the dynamics of the business. Or operating models suffer from lack of support from general enterprise resource planning (ERP) systems. In fashion retail data would be expected to be significantly more complex than in general retailing as products are seasonal, unique to a brand or a chain, must support a short-lived production, customers are not attracted by need but by desire, and multi-channel retailing requires both adaptation but also consistency across channels.

Traditionally enterprise information systems (EIS) have been addressing business data as either static (master data) or dynamic (transactions). Master data is therefore concerned with permanency and adequate and sufficient data of standardized representations. Transactions are derived from business processes and combine master data.

In operating the retail business, especially fashion retail, the master data model (MDM) has often been generic from standard EIS. Generic MDM's rule out product specific characteristics presented that In turn normally has been expected to be handled in e.g. a product data management (PDM) or product life-cycle management (PLM) system. As PDM/PLM in many cases only are loosely connected to the EIS (ERP) there is a many risk of loss of connectivity between the systems and the MDM is therefore simply not

A number of industrial standard propositions have been suggested to improve MDM in the fashion retail industry notably NRF ARTS and CEN CWA 16667:2013. Both ARTS and CWA16667 express specifically that the data model must be derived from the business and operating model. The propositions provide good opportunities for efficient interorganisational transaction exchange. The data models however need more analysis for actual implementation in the form of ability to

- Integrate into existing ERP systems
- Support rich media in especially B2C contexts
- Support concurrent channels i.e. convergence to omni-channel retailing

The problem statement can thus be formulated as:

What are the key characteristics of design and governance processes related to enhance the master data model in the fashion retail industry?

Theory for this paper is consisting of theory for fashion retail operations, and for the supply and information exchange within retailing. The accuracy and dynamics of data related to the operating models is provided by the theory of MDM. The theory on data modelling and master data is rich, but the actual requirements for the fashion retailing are less discussed. A general perception is frequently that fashion retail can't differ that much from general retailing and could use generic data models. This view is in most systems replaced with a "minimal subset" of fashion retail related data models. CEN 16667 is a major breakthrough although it still needs maturing and company-specific implementations.

### Case study

TexBrand is a leading European company in fashion wholesale and retail. TexBrand is privately held and operates around 2000 stores under five primary brands and several specialisations or affiliations of these brands. The stores are partially operated and owned by TexBrand and partially by a network of partners. Beside the stores, about 50% of the turnover is generated from wholesale activities to department stores, general chain stores and online retailers. Common to the stores are that they exclusively are selling TexBrand brands and that they are using point-of-sales (POS) systems supplied by TexBrand. The POS system enables fast and concise data to the stores and also facilitates retrieval of data for the central datawarehouse reporting system. TexBrand has since 2007 had increasing success with online retailing. Originally, online retailing was organized in a separate entity. Gradually some multi-channel retailing features has been introduced, but not omni-channel retailing.

The organizational separation of the online activities, and organizational distance to some retail partners have led to the identification on insufficiencies in the current master data model. The model was designing to support season and product creation, purchasing and support supply chain management from the manufacturers to the stores. The model was not designed to support high quality marketing material, photos, post-warehouse product lifecycle, and a multi-channel retail business model. Furthermore, the different primary brands have different cultures of data management ranging from loosely structured processes to processes with a high level of governance. Adding to this is that the existing data model has been tree-structured from brands to seasons and categories where the business considers to aim for a more dynamic structure of products combined across seasons and categories to suit the need of more specialised retailers, wholesalers and e-commerce operators.

TexBrand is now aiming for redesigning the operating master data model.

Important positions in the redesign are

- Extending the data model from supply chain management and in to marketing adding characteristics of PDM/PLM
- Recognising the dynamic character of the sales process ranging from one-off orders for short seasons and up to never-of-out-stock concepts
- Improved support of mixed channel structures
- More distinctive preservation of product history in the in-store phases

- Late phases of the product life cycle is seen as ideal for increasing the sales to wholesale customers, online retailers and partner owned stores

The case highlights the shortcoming of the traditional ERP-inspired master data model mostly servicing the supply chain management needs and to a lesser extent the commercial needs. Commercial needs require a broader understanding, especially considering the rapid growth in the digital channels and an expected slow decline of the physical retailing. Products are distributed and sold differently on the different platforms and this business model must be embedded into the MDM. Images, marketing material, rich media, references to external product referrals, and localisations (country/language adaptations) in the MDM will improve the overall efficiency of the sales process.

Main findings of this paper are related to the case-based character of the fashion retail MDM, the considerations of the distributed type of master data, the aiming at consolidating distributed data, and the necessary adaptation to the omni-channel future on both the B2B and the B2C level.

#### List of references

ALTER, S., 2002. The work system method for understanding information systems and information systems research. *Communications of the Association for Information Systems*, 9(6), pp. 90-104.

Arrigo, E. (2010). Innovation and Market-Driven Management in Fast Fashion Companies. *Symphonya. Emerging Issues in Management*, (2 Intangible Assets & Global Competition).

Ayanso, A., Lertwachara, K., & Thongpapanl, N. (2010). Technology-Enabled Retail Services and Online Sales Performance. *Journal of Computer Information Systems*, 50(3).

Battista, C., & Schiraldi, M. M. (2013). The Logistic Maturity Model: Application to a Fashion Company. *International Journal of Engineering Business Management*, 5, 1-11.

Berman, B., & Evans, J. R. (2007). *Retail Management: A Strategic Approach*, 11<sup>th</sup> ed. Prentice Hall.

BERNARD, S.A., 2012. An introduction to enterprise architecture. AuthorHouse.

BERSON, A., DUBOV, L., PLAGMAN, B.K. and RASKAS, P., 2011. Master data management and data governance. McGraw-Hill.

BRAUN, C. and WINTER, R., 2005. A comprehensive enterprise architecture metamodel and its implementation using a metamodeling platform. Desel, Jörg; Frank, Ulrich, , pp. 24-25.

Bruce, M., & Daly, L. (2010). Innovative process in E-commerce fashion supply chains. In: *Innovative Quick Response Programs in Logistics and Supply Chain Management* (pp. 227-242). Heidelberg: Springer Verlag.

Castelli, C. M., & Brun, A. (2010). Alignment of retail channels in the fashion supply chain: an empirical study of Italian fashion retailers. *International Journal of Retail & Distribution Management*, 38(1), 24-44.

Brun, A., Caniato, F., Caridi, M., Castelli, C., Miragliotta, G., Ronchi, S., ... & Spina, G. (2008). Logistics and supply chain management in luxury fashion retail: Empirical investigation of Italian firms. *International Journal of Production Economics*, 114(2), 554-570.

BUTLER, D., 2011. Master Data Management - an oracle white paper september 2011.

Caniato, F., Caridi, M., Moretto, A., Sianesi, A., & Spina, G. (2014). Integrating international fashion retail into new product development. *International Journal of Production Economics*, 147, 294-306.

Caro, F., & Martinez-de-Albéniz, V. (2014). Fast Fashion: Business Model Overview and Research Opportunities.

CHEONG, L.K. and CHANG, V., 2007. The need for data governance: a case study, 18th Australasian Conference on Information Systems. The University of Southern Queensland, Toowoomba, Australia 2007, pp. 999-1008.

Choi, T. M., Hui, C. L., Liu, N., Ng, S. F., & Yu, Y. (2013). Fast fashion sales forecasting with limited data and time. *Decision Support Systems*.

Choi, T. M. (2007). Pre-season stocking and pricing decisions for fashion retailers with multiple information updating. *International Journal of Production Economics*, 106(1), 146-170.

Cillo, P., & Verona, G. (2008). Search styles in style searching: exploring innovation strategies in fashion firms. *Long Range Planning*, 41(6), 650-671.

CLEVEN, A. and WORTMANN, F., 2010. Uncovering four strategies to approach master data management, System Sciences (HICSS), 2010 43rd Hawaii International Conference on 2010, IEEE, pp. 1-10.

COHEN, R., 2006. What's in a Name? Data governance roles, responsibilities and results factors. *DM Review*, 8.

COLE, R., PURAO, S., ROSSI, M. and SEIN, M.K., 2005. Being Proactive: Where Action Research Meets Design Research. ICIS 2005.

CROTTY, M., 1998. The foundations of social research: Meaning and perspective in the research process. Sage Publications Limited.

DAHLBERG, T., HEIKKILÄ, J. and HEIKKILÄ, M., 2011. Framework and Research Agenda for Master Data Management in Distributed Environments.

De Felice, F., Petrillo, A., & Autorino, C. (2013). Key success factors for organizational innovation in the fashion industry. *International Journal of Engineering Business Management*, 5(27), 1-11.

DREIBELBIS, A., HECHLER, E., MILMAN, I., OBERHOFER, M., VAN RUN, P. and WOLFSON, D., 2008. Enterprise master data management: an SOA approach to managing core information. Pearson Education.

DUBOIS, A. and GADDE, L., 2002. Systematic combining: an abductive approach to case research. *Journal of business research*, 55(7), pp. 553-560.

ECKERSON, W.W., 2002. Data quality and the bottom line: Achieving business success through a commitment to high quality data. The Data Warehousing Institute, , pp. 1-36.

FITZPATRICK, D., COALLIER, F. and RATTÉ, S., 2012. A holistic approach for the architecture and design of an ontology-based data integration capability in product master data management. *Product Lifecycle Management. Towards Knowledge-Rich Enterprises*. Springer, pp. 559-568.

FITZPATRICK, D., COALLIER, F. and RATTÉ, S., 2012. A holistic approach for the architecture and design of an ontology-based data integration capability in product master data management. *Product Lifecycle Management. Towards Knowledge-Rich Enterprises*. Springer, pp. 559-568.

GARG, A., KAZMAN, R. and CHEN, H., 2006. Interface descriptions for enterprise architecture. *science of Computer Programming*, 61(1), pp. 4-15.

Gereffi, G. (1999). International trade and industrial upgrading in the apparel commodity chain. *Journal of international economics*, 48(1), 37-70.

Grewal & Levy (2009) Emerging Issues in Retailing Research. *Journal of Retailing* 85 (4, 2009) 522–526

GOEL, A., 2006. Enterprise integration EAI vs. SOA vs. ESB. Infosys Technologies White Paper, 87.

HAUG, A. and ARLBJØRN, J.S., 2011. Barriers to master data quality. *Journal of Enterprise Information Management*, 24(3), pp. 288-303.

HE, H., 2003. What is service-oriented architecture. *Publicação eletrônica em*, 30, pp. 1-5.

HEILER, 2010. Solved Product data challenged with apparel (White paper).

Heinemann, G., & Schwarzl, C. (2010). Eight Success Factors in New Online Retailing. In *New Online Retailing* (pp. 92-186). Gabler.

Hübner, A. (2011). Framework for Retail Demand and Supply Chain Planning. In *Retail Category Management* (pp. 15-41). Springer Berlin Heidelberg.

Iannone, R., Ingenito, A., Martino, G., Miranda, S., Pepe, C., & Riemma, S. (2013). Merchandise and replenishment planning optimization for fashion retail. *International Journal of Engineering Business Management*.

IBM, 2007. The IBM Data Governance Council Maturity Model: Building a roadmap for effective data governance. IBM software group.

JÄRVINEN, P., 2007. Action research is similar to design science. *Quality & Quantity*, 41(1), pp. 37-54.

Jørgensen, A.P., Collard, M., Koch, C. (2010) Prototyping iPhone apps: Realistic experiences on the device. *NordiCHI 2010: Extended Boundaries. Proceedings of the Sixth Nordic Conference on Human-Computer Interaction. (ACM Conference Proceedings Series)* : , page 687-690, New York, ACM Press New York, NY, USA, 2010

KHATRI, V. and BROWN, C.V., 2010. Designing data governance. *Communications of the ACM*, 53(1), pp. 148-152.

KISTASAMY, C., VAN DER MERWE, A. and DE LA HARPE, A., 2010. The relationship between service oriented architecture and enterprise architecture, *Enterprise Distributed Object Computing Conference Workshops (EDOCW), 2010 14th IEEE International 2010, IEEE*, pp. 129-137.

Klena (2013) From transactions to relationships - Connecting with a transitioning shopper. IBM

LANKHORST, M.M., 2004. Enterprise architecture modelling—the issue of integration. *Advanced Engineering Informatics*, 18(4), pp. 205-216.

LANKHORST, M. and VAN DRUNEN, H., 2007. Enterprise Architecture Development and Modelling. Combining TOGAF and ArchiMate.

LOSER, C., LEGNER, C. and GIZANIS, D., 2004. Master data management for collaborative service processes, *International Conference on Service Systems and Service Management, Research Center for Contemporary Management, Tsinghua University, forthcoming 2004*.

LOSHIN, D., 2010. MDM Components and the Maturity Model. A DataFlux White Paper, 204.

Lu, Y., Karpova, E. E., & Fiore, A. M. (2011). Factors influencing international fashion retailers' entry mode choice. *Journal of Fashion Marketing and Management*, 15(1), 58-75.

LUCAS, A., 2010. Corporate data quality management in context, 2010, *Proceedings of the 15th International Conference on Information Quality*.

Lueg, R., Pedersen, M. M., & Clemmensen, S. N. (2013). The Role of Corporate Sustainability in a Low-Cost Business Model—A Case Study in the Scandinavian Fashion Industry. *Business Strategy and the Environment*.

MAGOULAS, T., HADZIC, A., SAARIKKO, T. and PESSI, K., 2012. Alignment in Enterprise Architecture: A Comparative Analysis of Four Architectural Approaches. *Electronic Journal of Information Systems Evaluation*, 15(1),.

- MARCANT, C., 2011. Product Information Management: Definition, Purpose, and Offering. SapientNitro.
- MCKEEN, J.D. and SMITH, H., 2008. IT strategy in action. Prentice Hall Press.
- MENET, L. and LAMOLLE, M., 2009. A Model Driven Engineering Approach Applied to Master Data Management, On the Move to Meaningful Internet Systems: OTM 2009 Workshops 2009, Springer, pp. 19-28.
- MISHRA, M.R., 2011. A Study on Challenges and Opportunities in Master Data Management. International Journal of Database Management Systems, 3(2),.
- MURPHY, J., BOIS, R. and NEWMARK, E., 2005. Taking the PIM Path on the MDM Journey. a July, .
- NAKAGAWA, E.Y., FERRARI, F.C., SASAKI, M.M. and MALDONADO, J.C., 2011. An aspect-oriented reference architecture for Software Engineering Environments. Journal of Systems and Software, 84(10), pp. 1670-1684.
- NEWMAN, D. and LOGAN, D., 2006. Governance Is an Essential Building Block for Enterprise Information Management. Gartner Research, Stamford, CT, 4.
- OBERHOFER, M. and DREIBELBIS, A., 2008. An introduction to the master data management Reference Architecture.
- OLSON, J.E., 2003. Data quality: the accuracy dimension. Morgan Kaufmann.
- OTTO, B., 2012. How to design the master data architecture: Findings from a case study at Bosch. International Journal of Information Management, 32(4), pp. 337-346.
- OTTO, B., 2012. Managing the business benefits of product data management: the case of Festo. Journal of Enterprise Information Management, 25(3), pp. 272-297.
- OTTO, B., HÜNER, K.M., BACK, A., BRENNER, W., JUNG, R., ÖSTERLE, H. and WINTER, R., 2009. Functional reference architecture for corporate master data management. Institute of Information Management, University of St.Gallen, St.Gallen, .
- OTTO, B., HÜNER, K.M. and ÖSTERLE, H., 2012. Toward a functional reference model for master data quality management. Information Systems and e-Business Management, 10(3), pp. 395-425.
- OTTO, B. and SCHMIDT, A., 2010. Enterprise master data architecture: Design decisions and options, 15th International Conference on Information Quality (ICIQ 2010), Little Rock 2010.
- PEFFERS, K., TUUNANEN, T., ROTHENBERGER, M.A. and CHATTERJEE, S., 2007. A design science research methodology for information systems research. Journal of Management Information Systems, 24(3), pp. 45-77.
- PLATON, 2006. Arla Foods - Master Data Management - whitepaper.

PULKKINEN, M., 2006. Systemic management of architectural decisions in enterprise architecture planning. four dimensions and three abstraction levels, *System Sciences*, 2006. HICSS'06. Proceedings of the 39th Annual Hawaii International Conference on 2006, IEEE, pp. 179a-179a.

Rajaram, K. (2001). Assortment planning in fashion retailing: methodology, application and analysis. *European Journal of Operational Research*, 129(1), 186-208.

REED, P., 2002. Reference Architecture: The best of best practices. The Rational Edge, .

Reynolds, J., Howard, E., Cuthbertson, C., & Hristov, L. (2007). Perspectives on retail format innovation: relating theory and practice. *International Journal of Retail & Distribution Management*, 35(8), 647-660.

RUSSOM, P., 2006. Taking data quality to the enterprise through data governance. The Data Warehousing Institute, Seattle, .

SAMMON, D., ADAM, F., NAGLE, T. and CARLSSON, S.A., 2010. Making Sense of the Master Data Management (MDM) Concept: Old Wine in New Bottles or New Wine in Old Bottles? *DSS 2010*, pp. 175-186.

SARFIELD, S., 2009. The data governance imperative. IT Governance Ltd.

Shaw, D., & Leeming, A. (1998). The Retail Industry and Information Technology. In *Modelling for Added Value* (pp. 139-154). Springer London.

SILVOLA, R., JAASKELAINEN, O., KROPSU-VEHKAPERÄ, H. and HAAPASALO, H., 2011. Managing one master data—challenges and preconditions. *Industrial Management & Data Systems*, 111(1), pp. 146-162.

SMITH, H.A. and MCKEEN, J.D., 2008. Developments in practice XXX: master data management: salvation or snake oil? *Communications of the Association for Information Systems*, 23.

SMYTH, G., 2013. Transforming an organization from fragile to agile with EA, SOA & BPM.

SNOW, C., 2008. Embrace the role and value of master data. *Manufacturing Business Technology*, 26(2), pp. 38-40.

SPEWAK, S.H. and HILL, S.C., 1993. Enterprise architecture planning: developing a blueprint for data, applications and technology. QED Information Sciences, Inc.

Sundström, M., & Reynolds, J. (2014). Final Report from the Expert Group on Retail Sector Innovation.

Suryandari, R. T., & Paswan, A. K. (2014). Online customer service and retail type-product congruence. *Journal of Retailing and Consumer Services*, 21(1), 69-76.

Tambo (2011) Enterprise architecture. IGI Global



Tambo, Gabel, Bækgaard, Olsen (2012)

Tambo (2014a) Innovation in Retail. *Journal of Retailing and Consumer Services*

Tambo (2014b) Omni-Channel Retail Information Systems. *Encyclopedia of Information Systems*

THOMAS, G., 2006. Alpha males and data disasters: the case for data governance. Brass Cannon Press.

THOMAS, G., 2006. The DGI data governance framework. The Data Governance Institute, Orlando, FL (USA), .

TOZER, G., 1999. Metadata management for information control and business success. Artech House, Inc.

Vaagen, H., & Wallace, S. W. (2008). Product variety arising from hedging in the fashion supply chains. *International Journal of Production Economics*, 114(2), 431-455.

VILMINKO-HEIKKINEN, R. and PEKKOLA, S., 2013. Establishing an Organization's Master Data Management Function: A Stepwise Approach, *System Sciences (HICSS)*, 2013 46th Hawaii International Conference on 2013, IEEE, pp. 4719-4728.

WEBER, K., OFNER, M., HSG, B., CDQ, C., BACK, A., BRENNER, W., ÖSTERLE, H. and WINTER, R., 2008. Case study Ciba—organizing master data management. BE HSG/CC CDQ/11, Institute of Information Management, University of St.Gallen, .

WENDE, K., 2007. A model for data governance—Organising accountabilities for data quality management, 18th Australasian Conference on Information Systems. The University of Southern Queensland, Toowoomba, Australia 2007, pp. 417-425.

WHITE, A., NEWMAN, D., LOGAN, D. and RADCLIFFE, J., 2006. Mastering master data management. Gartner Group, Stamford, .

WILLIAM XU, X. and LIU, T., 2003. A web-enabled PDM system in a collaborative design environment. *Robotics and Computer-Integrated Manufacturing*, 19(4), pp. 315-328.

WOLTER, R., 2007. Master Data Management (MDM) Hub Architecture.

WOLTER, R. and HASELDEN, K., 2006. The what, why, and how of master data management. Seattle: Microsoft Corporation, .

Wong, W. K., & Guo, Z. X. (2010). A hybrid intelligent model for medium-term sales forecasting in fashion retail supply chains using extreme learning machine and harmony search algorithm. *International Journal of Production Economics*, 128(2), 614-624.

YIN, R.K., 2009. Case study research: Design and methods. sage.

ZACHMAN, J.A., 1987. A framework for information systems architecture. *IBM Systems Journal*, 26(3), pp. 276-292.

Zhenxiang, W., & Lijie, Z. (2011). Case study of online retailing fast fashion industry. *International Journal of e-Education, e-Business, e-Management and e-Learning*, 1(3), 195-200.