Cross Channel Communication Design

Research proposal - version 2016

M.A.T. Mulder

-

mark@mulderrr.nl

Abstract. Nowadays, companies communicate with their customers using multiple channels. For new channels a new department and application is created, often resulting in a silo organisation and application landscape. Therefore, reorganising the organisation is needed as frequent as channels change. The Cross Channel Communication Design (C^3D) as suggested in this research proposal, is a design that supports communication through multiple digital bi-directional channels. This design builds on the communication of the transaction concept of the Performance in Social Interaction theory (Ψ-theory). The design supports the carrying out of communication transactions by means of a protocol, which comprises the complete transaction pattern, that is put between users and (legacy) applications.
The research has progressed and the first literature review paper has been published. Currently the research can go for Design Research, Action Research and/or Case Study options each with their own advantages and issues.

Key words: multichannel, cross channel communication, single channel, DEMO, design

1 Introduction

Nowadays, companies that want to communicate with their customers are using multiple communication channels. Almost daily new communication channels become available and companies have to choose whether or not to adapt to the new channel. Customers are more flexible in adaptation and quickly develop a preferred channel to communicate about specific topics. Moreover, customers tend to use different channels on different times (e.g. at work customers have different channels available than at home). Because of these fast changes, companies that want to keep up have to adjust their communication [37] towards these channels (e.g. Twitter and Facebook have become important channels to reach out to customers).

The practical problem for companies is that companies often cannot incorporate these channels in the existing application landscape because the legacy cannot cope with the new channel demands, thus creating application and organisational silos (multichannel [33], see figure 1).

Companies need to transform from the current multichannel silo organizational structure towards a C^3D which supports customer orientation, based on transactions within the environmentally demanded change rate. We suggest that transactions are likely to support the customer needs in his digital social behaviour where customers want to change channel during a transaction. Aside from transactions, the core of this design must support multiple communication channels while eliminating combinatorial effects when adding channels. This structure must be supported by business (organisational changes) and IT (application landscape changes). However, in order to enable companies to use this C^3D implementation within current design an interface is needed. The current legacy applications and (user) interfaces have to be able to cooperate within the new design to make this transition towards cross channel communication possible. The proposed way to integrate the existing applications with transactions is a communication protocol to let both worlds communicate.

Automation in the industry is getting larger. People need to communicate more and more with technical systems. The general acceptance level of systems that mimic social behaviour is higher than old legacy systems that were build from a technical point of view. Multichannel system implementations are still failing because the implementation and the organisation structure do not match. A design that matches the organisation structure is needed. This is a part of the described research.

Incorporating social behaviour into technical applications is a road that scientist have already taken for a long time. More and more systems are designed to support humans within social environments. No system has currently been defined to support the interaction from social systems to technical systems using transactions as a fundamental basis. This is the main approach taken.

In section 2 we will line out the base theories of this research proposal. In the following section, we will elaborate on the research status and on research objective in section 4. We elaborate on the research domains in section 5. Definitions are summarized in section 6. In sections 7.1, 7.2 and 7.3 the research questions are stated. In section 8 the chosen research method is elaborated. In section 7.4 the relevance for practise and science is mentioned. Finally, the outlook to the rest of the research in section 9 concludes this paper.

2 Used Theories

In this section we will elaborate on the base theories that are used in this research. The theories are not discussed in depth, but merely outlined for researchers outside the Enterprise Engineering domain.

2.1 PSI

Ψ-theory includes four axioms and a theorem. The operation axiom, the composition axiom, the transaction axiom, the distinction axiom and the organization

theorem. The operation axiom of the Ψ-theory states that in any organization, there are human actors, there is communication between these actors and the actors cooperate and interact to deliver some production. The transaction axiom states that there is communication between actors and this communication follows a precisely defined pattern, the transaction pattern. The composition axiom of the Y theory states that productions are also themselves composed of other productions in a recursive way. The Ψ-theory forms an essential part of enterprise ontology.

2.2 DELTA

The DELTA (δ-theory) or Enterprise Engineering (EE) system theory, is focussed on the construction and operation of systems. In the DELTA theory we will focus on the construction perspective, while at the same time being aware that systems do offer affordances and that they may be designed with some function(s) in mind. The grey-box system is in between the black-box and the white-box system. A well-known specialisation of the grey-box model is the Finite Automata (FA), often also called Finite State Machine (FSM). Another well-known specialisation of the grey-box model, next to the finite automaton, is the Discrete Event System (DES). A discrete event system is a discrete-state, event-driven conceptual system. By event-driven is meant that the system responds to the occurrence of particular events, commonly called the input events of the system.

In the CRISP theory, a system is called a crispie, and the world of a crispie is divided into two parts: the coordination world or C-world, and the production world or P-world. The behaviour of a crispie can be explained as follows. At every point in time, the C-world is in some state. At every point in time, a crispie disposes of a set of agenda (things to do). The set of C-facts in the agenda with response time t is called the activation at time t. In response to an activation, a function is evaluated.

Processors are the motors of crispies. Channels are able to contain and transmit C-facts. At every point in time, a processor loops through its operating cycle. It then selects a C-event from the current C-events to be dealt with (if any), and produces a response, according to the performance function of the corresponding crispie. These C-facts are delivered to the processor through one of its action channels.

These actions through channels of a crispie is where we connect our definition of channel to the media involved.

3 Research status

In this section we want to summarise the current status of the research. Though not all feedback has been processed in this paper, we want to have the processing done between the review and the EEDC session.

3.1 Preliminary research

The papers found about the subject can be sorted into a matrix like table 1. On one axe the focus, on the other axe the cross channel properties used to describe an aspect. The results from this literature research are summed in the critical literature review paper.

		Channel characteristics			
		Channel	Web Services	CRM	Customer Experience
Focus	Design	[22], [6], [29], [40]	[19], [27], [23], [7]	[2], [18]	
	Marketing	[8], [21], [9], [24], [39], [38]		[33],[47], [17]	[30], [28], [1], [42]
	Customer	[3], [48]		[44]	[32], [34]

Table 1. Preliminary papers ordered by focus and channel properties

3.2 Papers

We have completed the current literature review. The resulting paper is accepted on the EEWC 2016 [31]. The results from this paper that we can use for further research on four different topics are:

Customer Service
- The service-centred paradigm [32] focusses on interaction implementation but has to be further defined.
- The knowledge-based approach [45] for delivery channel specific services has relevant content issues.
- Reducing barriers for accepting services [45] using a business case should be considered.

Communication
- Understanding the communication part of customer experience to improve customer interaction [46].
- Use customer engagement [4] to improve positive behaviour on completion of transactions.
- Create data interpretation and measuring [47] using universal transaction patterns [14].
- Use Self-service technologys (SSTs) [13] to reduce costs while providing more channel options.

- Reducing and completing process steps using transactions according to the framework [28] including cancellations.
- Using a communication loop [28] using all communication steps.

Channel
- Guiding multitasking on different types of channels [43] optimising customer experience.
- Identify channel characteristics (e.g service delivered, business goals, customer context (e.g. situation, location, identity) [47], paradigm (interaction style) and target devices) [26] to combine with the business goal.
- Identify channel maturity in five maturity levels [48] that shows that our solution will end up in the highest maturity level.
- Identify channel strategy maturity [33] and influence on whether you can change channels and whether that change is disruptive to a transaction.
- Use functional patterns [29] to find the similarities of the channels.

Implementation
- Find the most efficient channels [32, p.322] using efficiency measurement during use.
- Study Service Experience Blueprint (SEB) service links contribution to combining channels and include the state of the transaction.
- The organisation changes towards omnichannel [5] using the essential transactions.
- Training free user interfaces [12] to easy introduce new channels in customer communication.
- Design a best-of-breed [25] modular concept in such a way that specialized parts can be exchanged.
- Address multichannel strategy issues [48] by modelling the business part of the cross channel communication using δ-theory [16].

4 Research objective

The research objective is to create a practical 'ready to use' IT communication protocol based on DELTA-processors bounded within C^3D by using formalized social transactions and bi-directional digitized communication channels while retaining the context within transactions and across channels, within an organisational structure.

This objective will support companies in installing the cross channel communication protocol between social interaction systems and technical interaction systems to support technical systems in social behaviour in and across channels. Subsequently, this will enable companies to create social interaction systems for customers. By creating social interaction supportive systems, in combination with a transaction based organisation, the gap between human social interaction and socio-technical interaction will become smaller when those technical systems

can be adapted.

We define C^{3}D as the communication within a single transaction, as defined within Ψ-theory, over two or more channels.

To reach this objective the following research questions need to be answered:

1. How can a transaction in the B-organisation, as described in the Ψ-theory, be implemented in an phisical organisation and transformed to communication steps, as described in δ-theory, in such a way that communication steps support multiple channels.
2. a) How can the communication context within a transaction be preserved between channels during a transaction within C^{3}D?
   b) How can we define the end of a communication step, as defined in δ-theory, in such a way that the next step in a transaction can be processed?

5 Research domains

To solve this problem we decided to start the research in three domains. Communication, EE and DES are good candidates next to business documentation. Moreover, the literature research showed that marketing and business oriented domains do have ideas about C^{3}D but have no design theory. Two partial ideas can help us to start solving this problem:

- Communicate in a uniform way throughout the company so we know what will be and has been communicated.
- Dismantle the silos within companies by applying a uniform communication design.

The C^{3}D proposed in this research is intended to support the implementation of communication on digital bi-directional channels within the concept of transactions defined in Ψ-theory. The design contains transaction support protocol that is positioned between (legacy) applications and a (user)interface supporting all transaction steps. So far three theories are interesting because they have concepts that may solve different parts of this problems. These theories have been complemented with current views from various marketing and business views in the literature review (see results in 3).

1. The Ψ-theory [14] proposes a transaction mechanism between two actor roles and therefore a uniform way of communication. This theory acts on the essence of an organisation or system without implementation suggestions. Implementation of the transaction in a socio-technical system is needed to solve the problem.
2. The δ-theory describes a transaction of the Ψ-theory as a socio-technical implementation.

3. DESs allows us to mathematically describe the DELTA model.

Other options that have to be examined are mentioned in section 3.1.

When we combine the three theories in order to implement the transaction, an interesting construction emerges. The δ-theory describes the workflow of the transaction. It can be expanded to describe all transactions in the model. Building the transaction using a DELTA (δ-theory) makes it possible to implement transactions in an automated system. Research must confirm whether this construction is able to be implemented in an existing multichannel environment.

6 Definitions

Although we already found some definitions in literature we will use provisional definitions for the items we need a definition in this research proposal. During the research process these definitions will be replaced by the final definitions.

To build up C^{3}D we need definitions of every separate word in a logical order.

Definition 1. *: Channel*
*A **Channel** is a protocol description used for communication over a medium during the execution of a transaction.*

This definition has evolved from information to protocol description because whether the data is information is up to the participants. We also bounded the channel to be existent during a transaction. Last we restricted the channel to be of use for communication.

Provisional Definition 1 *: Cross*
Cross is a movement from one place (here channel) to another.

Provisional Definition 2 *: Communication*
Communication is the two-way process of reaching mutual understanding, in which participants not only exchange (encode-decode) information but also create and share meaning.

For Cross Channel Communication we derive the definition definition [41].

Provisional Definition 3 *: Cross Channel Communication*
Cross Channel Communication is the communication within and across channels taking into account communication context.

To be added: Design Definitions

For the C^{3}D the design look, function and operations need to be defined. These design principles will include the principles for a channel being bi-directional, having a preference property for the receiver and having a context.

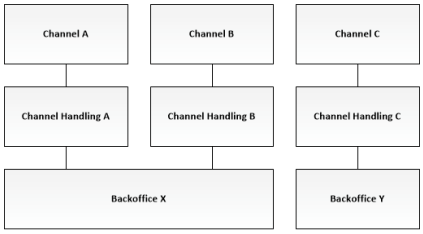

Fig. 1. Multichannel Communication

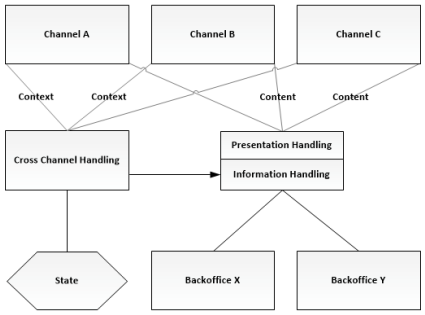

Fig. 2. Cross Channel Communication

Provisional Definition 4 *C^3D is the design allowing cross channel communication over bi-directional digital channels that take into account customer preferences and context, and engage recipients via their preferred channel.*

7 Research questions

7.1 Research question 1

1. How can a transaction in the B-organisation, as described in the Ψ-theory, be implemented in an phisical organisation and transformed to communication steps, as described in δ-theory, in such a way that communication steps support multiple channels.

Advanced multichannel integrated systems nowadays mostly refer to the retail branch (i.e. bricks-and-mortar shops and web shops). Companies that implement multichannel strategies that are not checked on, deliver results that are not based on best practice or available scientific evidence.
At least the following concepts play an important role in designing the C^3D.

Channel
When studying Cross Channel Communication in the literature the following questions still remain unanswered.

- Can cross channel communication be automated and what supporting design is needed to achieve this?
- Which channels exist and what properties do they have?
- Channels are digital bi-directional ways of communication. Is there a difference in social perception between the terms media and channels?

Transparency
Transparency is about communicating the anticipated path in the process that will follow and the steps that have been taken. When we create a construction model of the current organisation (using DEMO [14]) we need to communicate

about the current and future steps in the model to the customer. This communication can be straight forward. A few related questions remain.

- How is transparency defined in science and does an existing definition suit the C^{3}D meaning of transparency?
- How does transparency relate to customer experience?
- Which transparency implementations already exist to serve customers in current multichannel communication environments?
- Do the current transparency mechanisms work according to customers?
- Which design currently exist behind the transparency mechanisms?

Transparency is all about communication both internally and externally. When discussing transparency within communication the question arises whether companies have any idea whether they do communicate in a transparent way. The conditions and strategic choices in transparent customer communication have been considered [10] to make the change possible. Referenced articles need to be researched to complete the definition within the C^{3}D.

Consistency
Consistency in communication is about the semantics of the message on various channels. This raises the following supporting questions.

- What is needed to communicate consistently along channels?
- How is a customer able to notice that consistent communication is being used?
- What shall be the influence of consistent communication on customer experience?
- What is the relevance of consistency for semantics and knowledge bases?
- Does consistency translate into context criteria?

Knowledge bases support people with different backgrounds but still need to provide the same knowledge to all readers. A method to accomplish this [11] is described and can be used as a starting point for the definition.

7.2 Research question 2

2. a) How can the communication context within a transaction be preserved between channels during a transaction within C^{3}D?

To automate a transaction the processing of transaction states and events is needed. The δ-theory describing a finite automata with time capabilities. Because the Ψ-theory describes the universal social transaction between humans and the δ-theory is the base of these transactions we assume that the technical implementation of the δ-theory forms the basis of the technical implementation of social communication.

The communication between the DES or δ-theory processor is configured in the engine combining several processors in a specific structure or completely independent. On the left side (see figure 4) the Service Oriented Architecture (SOA)

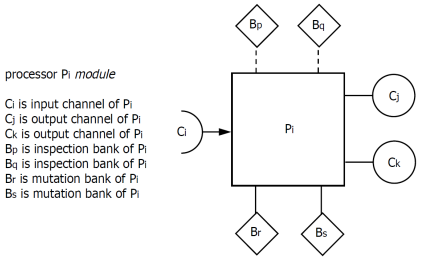

Fig. 3. The δ-theory processor as described in the δ-theory

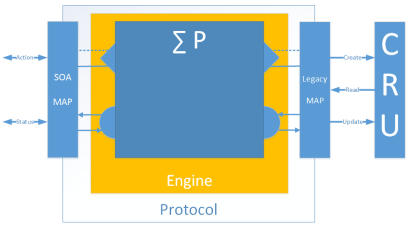

Fig. 4. The Communication Protocol and the δ-theory Processor Engine

defines two endpoints that supports the full transaction communication and production acts/facts. The action entry can also be used in a legacy or traditional call ignoring the social status entry. The legacy map supports the resulting status and event translation towards legacy systems. Every possible state translates to either create, read, or update action. The delete action is skipped because this is assumed to be done using garbage collection if information has to be deleted permanently. Other delete actions are considered to be updates of existing data.

To have just a protocol supporting the technical implementation of a social transaction is not enough to fully implement the C^{3}D. For this implementation to work, the transaction has to be able to be used across all bi-directional digital channels. The only way to switch channels and stay within the social transaction is to maintain the context of the transaction. To make the protocol usable it is necessary to find the context preservation criteria and to create the automated preservation of context across channels.

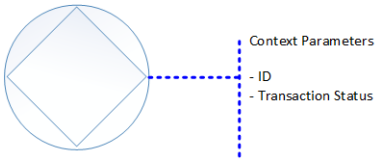

Fig. 5. Transaction Context Parameters

For each channel the context criteria need to be found and an overall list of needed context criteria needs to be created. Channels have two options when they are added to the C^{3}D. Either the channel has the ability to provide the context criteria and blend in or the channel is not able by nature to provide all criteria. The channel provides a mechanism to use another channel to provide the information or use an extra technique to add the context criteria to the C^{3}D.

7.3 Research question 3

3. a) How can we define the end of a communication step, as defined in δ-theory, in such a way that the next step in a transaction can be processed?

This question still has to be described.

7.4 Relevance

Integration of automation in the industry
Automation in the industry is getting larger. People need to communicate more and more with technical systems. The general acceptance level of systems that mimic social behaviour is higher than old legacy systems that were build from a technical point of view. Multichannel system implementations are still failing because the implementation and the organisation structure do not match. An design that matches the organisation structure is needed.

Scientific
Incorporating social behaviour into technical applications is a road that scientist have already taken for a long time. More and more systems are designed to support humans within social environments. No system has currently been defined to support the interaction from social systems to technical systems using transactions as a fundamental basis.

The revocation patterns of DEMO have not yet been documented implemented. This research adds to the knowledge of implementing automated DEMO transactions in organisations. The feasibility of implementation of the δ-theory is tested.

8 Approach

We are still unsure about how the method of Design Science Research is going to be used [20][36]. According to this methodology artefacts are created based on available knowledge and are validated by application in an appropriate environment.

This method would be appropriate because not all definitions within the design are available these have to be created and matched per category to existing supporting literature.

The artefact could be the design itself or the application of the δ-theory and Ψ-theory in a practical case study.

The Ψ-theory describes the organization as a social system. This theory describes actor roles and transactions. Subsequently, business actors perform coordination acts and production acts, using different abilities in order to create coordination facts and production facts. Business actors need these facts, or derivations of these facts, to decide on the acts to perform. Furthermore, the

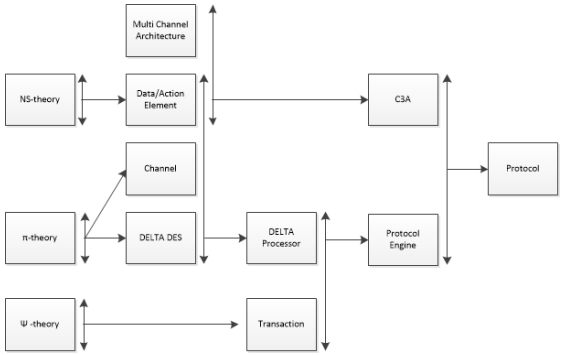

Fig. 6. Research Framework

Ψ-theory describes the generic process of deriving an object system from a using system (e.g. the derivation of the infological organization from the business organization). The using system if the base for the underlying function model of the object system is defined. Subsequently, the implementation-independent construction model of the object system, also known as the ontological model, is designed. Many alternative implementation models could be produced from the ontological model. One implementation on infological level can be the base of the transaction protocol based on the δ-theory processor.

The δ-theory processor can be developed as an artefact and can be used to execute the generic transaction. The transaction could be described in a DES. The processor will use another artefact, the channel, to communicate to itself and other processors. These two artefacts (the channel and the processor) can be validated using automated testing where predefined use cases are used. A protocol will be created as an artefact using the tested processor environment and will be available for integration in third party programs. This protocol will be validated in a case study. In this case study an Organisation Construction Diagram (OCD) will be created for a specific problem area of the organisation where the protocol is believed to improve multichannel communication. The C^3D definitions and the protocol will be presented in an design that is suitable to be used for customer facing services. The whole will be tested in a limited number of case studies. These case studies will try to implement the protocol in an existing environment in a pilot case to show the improvement of customer communication. Possible improvement measurements can be Net Promoter Score, number of complaints or a direct measure of the customer satisfaction of the transaction.

9 Outlook

To enable customers to switch channels during communication, allowing new communication channels a design has to be created. Two theories have been chosen as starting point to create this design and build a communication protocol. The current, open for discussion, goal is to implement the protocol in three

case studies and prove that the theories hold during implementation. Where needed other theories or best practises will be added to complete the artefacts. Based on the preliminary research some addition can be made on the design from those papers.

According to the planning the next steps this year are to design the artefacts to an usable level and to run the protocol in a test environment. Then the case studies can be defined and the protocol can be implemented in a real organisation.

References

1. Albesa, J. G. Interaction channel choice in a multichannel environment, an empirical study. *International journal of bank marketing 25*, 7 (2007), 490–506.
2. Ashouri, A., Faed, A., and DEBII, C. The impact of multichannel customer management on e-crm. In *UKSim Fourth European Modelling Symposium on Computer Modelling and Simulation* (2010), IEEE, pp. 183–187.
3. Bendoly, E., Blocher, J. D., Bretthauer, K. M., Krishnan, S., and Venkataramanan, M. A. Online/in-store integration and customer retention. *Journal of Service Research 7*, 4 (2005), 313–327.
4. Bijmolt, T. H. A., Leeflang, P. S. H., Block, F., Eisenbeiss, M., Hardie, B. G. S., Lemmens, A., and Saffert, P. Analytics for customer engagement. *Journal of Service Research 13*, 3 (2010), 341–356.
5. Chan, J. P. The promise of digital technology in brick and mortar retail. *The promise of digital technology in brick and mortar retail* (2013).
6. Chevrin, V., Derycke, A., and Rouillard, J. Some issues for the modelling of interactive e-services from the customer multi-channel interaction perspectives. In *e-Technology, e-Commerce and e-Service, 2005. EEE'05. Proceedings. The 2005 IEEE International Conference on* (2005), IEEE, pp. 256–259.
7. Chevrin, V., Derycke, A., and Rouillard, J. Project ubi-learn: An intermediation infrastructure for multi-channel accesses to future lms. In *Telecommunications, 2006. AICT-ICIW'06. International Conference on Internet and Web Applications and Services/Advanced International Conference on* (2006), IEEE, pp. 7–7.
8. Chevrin, V., Sockeel, S., and Dervcke, A. An intermediation middleware for supporting ubiquitous interaction in mobile commerce. In *Pervasive Services, 2006 ACS/IEEE International Conference on* (2006), IEEE, pp. 321–324.
9. Chiu, H. C., Hsieh, Y., Roan, J., Tseng, K. J., and Hsieh, J. K. The challenge for multichannel services: Cross-channel free-riding behavior. *Electronic Commerce Research and Applications 10*, 2 (2011), 268–277.
10. Christensen, L. T. Corporate communication: the challenge of transparency. *Corporate Communications: An International Journal 7*, 3 (2002), 162–168.
11. Ciuciu, I., Kang, H., Meersman, R., Schmid, J., Magnenat-Thalmann, N., Guitian, J. A. I., and Gobbetti, E. Collaborative semantic content management: an ongoing case study for imaging applications. *Proc.ECKM, Portugal* (2010).
12. Clark, W., and Cearley, D. W. Mobile applications and interfaces: New approaches for amultichannelfuture. *Gartner* (2012).

13. Collier, J. E., and Kimes, S. E. Only if it is convenient understanding how convenience influences self-service technology evaluation. *Journal of Service Research 16*, 1 (2013), 39–51.
14. Dietz, J. L. G. *Enterprise ontology: theory and methodology.* Springer, 2006.
15. Dietz, J. L. G. *Architecture: building strategy into design.* Academic Service The Hague, 2008.
16. Dietz, J. L. G. Delta. Technical Report TR-FIT-15-05, Czech Technical University, 2015.
17. Dimitriadis, S., and Stevens, E. Integrated customer relationship management for service activities: an internal/external gap model. *Managing Service Quality 18*, 5 (2008), 496–511.
18. Frow, P., Payne, A., Wilkinson, I. F., and Young, L. Customer management and crm: addressing the dark side. *Journal of Services Marketing 25*, 2 (2011), 79–89.
19. Ganesh, J., Padmabhun, S., and Moitra, D. Web services and multi-channel integration: A proposed framework. In *Web Services, 2004. Proceedings. IEEE International Conference on* (2004), IEEE, pp. 70–77.
20. Hevner, A. R., March, S. T., Park, J., and Ram, S. Design science in information systems research. *MIS quarterly 28*, 1 (2004), 75–105.
21. Hong-jian, X. U. E. Challenge to retail banks for channels and multichannels integration. In *Finance Forum* (2006), vol. 4, p. 008.
22. Janssen, M., Wagenaar, R., and Beerens, J. Towards a flexible ict-architecture for multi-channel e-government service provisioning. In *System Sciences, 2003. Proceedings of the 36th Annual Hawaii International Conference on* (2003), IEEE, p. 10 pp.
23. Jefferies, C., Brereton, P., and Turner, M. A systematic literature review of approaches to reengineering for multi-channel access. In *Software Maintenance and Reengineering, 2008. CSMR 2008. 12th European Conference on* (2008), IEEE, pp. 258–262.
24. Jin, B., Park, J. Y., and Kim, J. Joint influence of online store attributes and offline operations on performance of multichannel retailers. *Behaviour and Information Technology 29*, 1 (2010), 85–96.
25. Johnson, G., Kraus, D., and Boold, S. Critical capabilities for contact center infrastructure. *Gartner* (2012).
26. Jones, N. Fit mobility into a multichannel and multiplatform strategy. *Gartner* (2012).
27. Khan, M. T., and Siddique, A. Multi-channel integration framework for web services-based business. In *Engineering, Sciences and Technology, Student Conference On* (2004), IEEE, pp. 165–168.
28. Kumar, V. A customer lifetime value-based approach to marketing in the multichannel, multimedia retailing environment. *Journal of Interactive Marketing 24*, 2 (2010), 71–85.
29. Lankhorst, M. M., and Luttighuis, P. H. W. M. O. Enterprise architecture patterns for multichannel management. In *Patterns in Enterprise Architecture Management (PEAM2009) Workshop. Presented at the Patterns in Enterprise Architecture Management (PEAM2009) Workshop, Kaiserslautern, Germany* (2009).
30. McIverHonours, P. Multichannel shopping: The relationship between search and purchase channel choice. *ANZMAC* (2009).
31. Mulder, M. A. T. Cross channel communication design critical literature review. In *Advances in Enterprise Engineering X* (2016), vol. 10.

32. Patrcio, L., Fisk, R. P., and e Cunha, J. F. Designing multi-interface service experiences the service experience blueprint. *Journal of Service Research 10*, 4 (2008), 318–334.
33. Payne, A., and Frow, P. The role of multichannel integration in customer relationship management. *Industrial Marketing Management 33*, 6 (2004), 527–538.
34. Pl, L. Managing multichannel coordination in retail banking: the influence of customer participation. *International Journal of Bank Marketing 24*, 5 (2006), 327–345.
35. Press, O. U. Oxford dictionaries.
36. Recker, J. *Scientific research in information systems: a beginner's guide*. Springer Science and Business Media, 2012.
37. Rosa, M. I. Omni-channel retailing: is it order online pick-up in store service viable in the portuguese grocery industry?, 2012.
38. Rosenbloom, B. Multi-channel strategy in business-to-business markets: Prospects and problems. *Industrial Marketing Management 36*, 1 (2007), 4–9.
39. Sharma, A., and Mehrotra, A. Choosing an optimal channel mix in multichannel environments. *Industrial Marketing Management 36*, 1 (2007), 21–28.
40. Shen, W., Hao, Q., Mak, H., Neelamkavil, J., Xie, H., Dickinson, J., Thomas, R., Pardasani, A., and Xue, H. Systems integration and collaboration in architecture, engineering, construction, and facilities management: A review. *Advanced Engineering Informatics 24*, 2 (2010), 196–207.
41. Shneyder, L. Multi vs. cross channel marketing, 2012.
42. Sousa, R., and Voss, C. A. Service quality in multichannel services employing virtual channels. *Journal of Service Research 8*, 4 (2006), 356–371.
43. Stephens, K. K. Multiple conversations during organizational meetings development of the multicommunicating scale. *Management Communication Quarterly 26*, 2 (2012), 195–223.
44. Stone, M., Hobbs, M., and Khaleeli, M. Multichannel customer management: The benefits and challenges. *The Journal of Database Marketing 10*, 1 (2002), 39–52.
45. Vassilakis, C., Lepouras, G., and Halatsis, C. A knowledge-based approach for developing multi-channel e-government services. *Electronic Commerce Research and Applications 6*, 1 (2007), 113–124.
46. Verhoef, P. C., Reinartz, W. J., and Krafft, M. Customer engagement as a new perspective in customer management. *Journal of Service Research 13*, 3 (2010), 247–252.
47. Verhoef, P. C., Venkatesan, R., McAlister, L., Malthouse, E. C., Krafft, M., and Ganesan, S. Crm in data-rich multichannel retailing environments: a review and future research directions. *Journal of Interactive Marketing 24*, 2 (2010), 121–137.
48. Zhang, J., Farris, P. W., Irvin, J. W., Kushwaha, T., Steenburgh, T. J., and Weitz, B. A. Crafting integrated multichannel retailing strategies. *Journal of Interactive Marketing 24*, 2 (2010), 168–180.