

Analysis on extending Finture's role in the mortgage-intermediary's primary process

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Voorwoord

De afgelopen 5 maanden heb ik de laatste horde in mijn studieprogramma genomen. Vanaf 2 januari heb ik met veel plezier bij Topicus gewerkt aan mijn afstudeerproject, het resultaat hiervan ligt voor u. Met deze 144 pagina's hypotheekproces-plezier sluit ik mijn studie opgewekt af.

Mijn maanden bij Topicus waren erg interessant. Naast de inhoudelijke uitdaging heb ik het als zeer leerzaam ervaren om in de keuken te kijken van een innovatief softwarehuis. Bovenal was het een zeer plezierige werkomgeving! Wat mij betreft mag Topicus zich met recht één van de leukste IT-bedrijven in Nederland noemen.

Natuurlijk heb ik dit resultaat niet alleen bereikt. Maria Iacob en Manfred Reichert, mijn begeleiders vanuit de Universiteit Twente, wil ik bedanken voor hun inzet en kritische kanttekeningen. Zij hebben hun rol als bewakers van de academische waarden uitstekend vervuld. Joost van Beek, mijn begeleider vanuit Topicus, wil ik hartelijk bedanken voor zijn scherpe feedback, wijze adviezen en positieve instelling. Daarnaast wil ik alle andere Topicanen aan de Brinkpoortstraat bedanken voor de uiterst prettige werkomgeving!

Uiteraard wil ik mijn ouders, broers met al hun kroost, zusje, oud-huisgenoten en vrienden bedanken voor hun hulp en vooral plezier in de afgelopen 6 jaar.

Nu deze laatste horde is genomen, kan ik eindelijk voluit naar voren rennen en laten zien dat er een nóg leuker softwarehuis mogelijk is. Ik heb nog geen idee waar de finish ligt, maar ik weet wel dat ik zeer gemotiveerd ben en uitkijk naar elke meter!

Gerben de Haan

Deventer, 11 juni 2007

Summary

The Dutch mortgage-market has experienced significant changes during the last decade. Several aspects led to a shift in market share from the banks to intermediary organizations. As a response to this development, Topicus teamed up with a few intermediary organizations and developed an application that offers support for the workflow in the intermediary organization. This system, Finture, is developed based on the FORCE framework. The main functional goal of Finture is to offer complete support for the intermediary's primary process, as well as all interactions with its chain-partners. In realizing this goal, Topicus questioned how Finture's role in the intermediary's primary process could be improved and extended. This question is the main research question in this research. In answering this question, the BiZZdesign approach is adopted. This approach originates in the Dutch financial sector and is aimed at analysis and design of (support for) information intensive processes. The main research question is answered in five research steps. The first two steps consist of an analysis of the overall mortgage chain and Finture's current role in it. By mapping these two situations, the unsupported processes are identified. Each of these processes is input for the two final steps, consisting of an in-depth analysis of the process and the identification, evaluation and recommendation of implementation alternatives.

The mortgage intermediary mediates between mortgage providers and customers interested in acquiring a mortgage. Finture facilitates the workflow in this process, it guides customer-propositions through the process, steering the intermediary employees. All interactions between the intermediary and its chain-partners are supported by Finture. Regarding activities in the primary process, the generation of the advice report is not supported. For this activity, intermediaries currently use additional third party software. Besides offering support for the advice generation, support for the Offer Acceptance Check introduces an additional added value. The evaluation of implementation alternatives for mortgage advice functionality showed that there is no directly available solution. When Topicus decides that this functionality is desired, it is assumed that it should be developed in-house. Due to the complexity in calculations and diversity and dynamism of the information involved, it is recommended to team up with an advice-software solution provider to develop a service-oriented solution together. For the Offer Acceptance Check it is recommended to use third party check components, installed on the Finture ASP platform. In using these external components, Topicus is not responsible for maintenance of the components in order to conform to the changing check norms of all providers and products.

In the recommended situation, Finture offers an extended support for the mortgage intermediary's primary process, within the boundaries of the Topicus corporate strategy.

Samenvatting

De situatie op de Nederlandse hypotheekmarkt is de laatste jaren sterk veranderd. Meerdere factoren hebben geleid tot een verschuiving van marktaandeel in hypotheekbemiddeling van de grootbanken naar tussenpersonen. Inspelend op deze ontwikkeling heeft Topicus in samenwerking met enkele tussenpersoonorganisaties een systeem ontwikkeld ter ondersteuning van de workflow in de tussenpersoon-organisatie. Dit systeem, Finture genaamd, is ontwikkeld op basis van het FORCE framework. Het functionele doel van Finture is het bieden van ondersteuning voor het gehele primaire bedrijfsproces van de hypotheek-tussenpersoon en alle interacties met haar ketenpartners. Om dit doel te realiseren vroeg Topicus zich af hoe Finture het primaire proces van de hypotheek tussenpersoon beter kan ondersteunen. Deze vraag is de hoofdvraag in dit onderzoek. Om deze vraag te beantwoorden is de BiZZdesign methodiek toegepast. Deze methodiek komt voort uit de Nederlandse financiële sector en is gericht op analyse en ontwerp van informatie intensieve processen. De hoofdvraag is beantwoord in vijf onderzoeksstappen. De eerste twee stappen worden gevormd door een analyse van de algemene hypotheekketen en de huidige rol van Finture binnen de tussenpersoonorganisatie. Door deze twee situaties met elkaar te vergelijken zijn de niet ondersteunende subprocessen geïdentificeerd. Elk van deze processen is vervolgens in meer detail geanalyseerd waarna implementatie-alternatieven zijn vastgesteld, geëvalueerd en waarvan tenslotte één alternatief is aanbevolen.

De hypotheektussenpersoon bemiddelt tussen hypotheekverstrekkers en consumenten die op zoek zijn naar een hypotheek. Finture faciliteert de workflow in dit proces, het leidt de klantproposities door het bedrijfsproces van de tussenpersoon en stuurt daarmee de medewerkers. Alle interacties tussen de tussenpersoon en de diverse ketenpartners worden momenteel ondersteund door Finture. Wat betreft de activiteiten in het proces, wordt het genereren van het wettelijk vereiste adviesrapport niet ondersteund. Hiervoor gebruikt de tussenpersoon momenteel externe software. Naast deze adviesfunctionaliteit zou ondersteuning van de Offerte Acceptatie Toets stap een toegevoegde waarde betekenen voor Finture. Uit de evaluatie van implementatie-alternatieven voor ondersteuning van hypotheekadvies functionaliteit bleek dat er geen direct beschikbare oplossing is. Wanneer Topicus besluit dat deze functionaliteit gewenst is, is het aannemelijk dat dit intern ontwikkeld moet worden. Vanwege de complexiteit van de onderliggende berekeningen en diversiteit en dynamiek van de benodigde informatie, is het aan te raden samen te werken met een hypotheekadviessoftware-leverancier om samen een webservice georiënteerde oplossing te ontwikkelen. Wat betreft de Offerte Acceptatie Toets functionaliteit is het aan te raden om externe toets-componenten te gebruiken die geïnstalleerd zijn op het Finture ASP platform. Door deze componenten te gebruiken is Topicus niet verantwoordelijk voor het bijhouden van wijzigingen in de betreffende acceptatiekaders. In deze opzet ondersteunt Finture het proces van de tussenpersoon beter, binnen de kaders van de Topicus bedrijfsstrategie.

Table of Contents

Voorwoord	i
Summary.....	ii
Samenvatting	iii
List of Figures & Tables	vi
1. Introduction	1
1.1. Background mortgage market	1
1.2. Background Finture.....	3
1.3. Background & mission Topicus.....	4
2. Research outline	5
2.1. Research motive.....	5
2.2. Research Scope.....	5
2.3. Research Approach	6
2.4. Synopsis theoretical background.....	9
3. Theoretical background Business Process Literature	10
3.1. Introduction.....	10
3.2. Business Process & Workflow	11
3.3. Relation Business Process & Workflow concepts	13
3.4. Business Process Change approaches	14
3.5. Conclusions on Business Process Change approaches.....	18
3.6. Positioning Framework BPR activities & techniques	19
3.7. Analysis BP Change activities & Techniques	23
3.8. Activities, research questions and techniques in S-L framework.....	27
4. Selecting BPR Approach for Mortgage/Finture case.....	31
4.1. Mortgage intermediary primary process	31
4.2. Different BPR approaches/toolsets	32
4.3. Conclusion on selected approach	32
4.4. BiZZdesign Analysis & Redesign approaches	33
5. Analysis approach	35
5.1. Scoping.....	35
5.2. Determining means	36
5.3. Modelling	41
5.4. Analysis	55
5.5. Evaluation & Selection.....	59
5.6. Synopsis analysis mortgage chain & Finture as-is	61

6.	In-depth analysis Mortgage Advice	62
6.1.	Goal	62
6.2.	Actors.....	62
6.3.	Mortgage advice sub-process	64
6.4.	Knowledge/information involved	65
6.5.	Current situation	70
6.6.	Requirements	71
6.7.	Conclusions on in-depth analysis mortgage advice sub-process	73
7.	In-depth analysis Offer Acceptance Check	74
7.1.	Goal	74
7.2.	Actors.....	75
7.3.	Offer Acceptance Check sub-process	76
7.4.	Knowledge/information involved	79
7.5.	Current situation	81
7.6.	Requirements	81
7.7.	Conclusions on in-depth analysis Offer Acceptance Check.....	83
8.	Redesign approach - Mortgage Advice	84
8.1.	Determining range.....	84
8.2.	Determining essentials	86
8.3.	Design alternatives	87
8.4.	Compare and choose.....	97
9.	Redesign approach – Offer Acceptance Check	102
9.1.	Determining range.....	102
9.2.	Determining essentials	104
9.3.	Design alternatives	105
9.4.	Compare and choose.....	110
10.	Conclusions and Recommendations	114
10.1.	Summary per section	114
10.2.	Conclusion & Recommendations	117
10.3.	Architecture recommended situation	119
	References	121
	Appendix A - Detailed context diagram mortgage chain.....	125
	Appendix B – Detailed Context Diagram Finture As-Is	126
	Appendix C - Detailed Context Diagram mortgage chain ex. Finture ...	127
	Appendix D - Evaluation alternatives Mortgage Advice	128
	Appendix E - Evaluation alternatives Offer Acceptance Check.....	132

List of Figures & Tables

Figures

Figure 1 – Force field Dutch Mortgage market. Adapted from Kruszel & Van Reenen.....	1
Figure 2 - Finture concept. Adopted from [KRA05a].....	3
Figure 3 - Topicus organization model	4
Figure 4 - Coherence research goals	6
Figure 5 - Research model	8
Figure 6 - Relations Business Process & Workflow (Management) concepts [WFMC99]	13
Figure 7 - Essential Business Process Change projects	18
Figure 8 - Consolidated BPR methodology [MUT99]	19
Figure 9 - Business Process Lifecycle [GEO98]	20
Figure 10 - Information System Lifecycle [AVI92]	21
Figure 11 - Stage - Level framework	22
Figure 12 - Positioning BPR activities in Stage-Level framework	27
Figure 13 - Positioning research questions in S-L framework.....	28
Figure 14 – Positioning Modelling techniques in S-L framework	29
Figure 15 - External Value Chain mortgage chain	41
Figure 16 - Actor diagram mortgage process	42
Figure 17 – Phasing overall mortgage process	43
Figure 18 - Sub-process Acquisition phase	44
Figure 19 - Sub-process Analysis & Advice phase	45
Figure 20 - Sub-process Offer phase	46
Figure 21 - Sub-process Final acceptance phase	47
Figure 22 - Sub-process Transfer phase.....	48
Figure 23 - Sub-process Finalization phase.....	49
Figure 24 - Intermediary primary process, 'prospect-phase'.....	49
Figure 25 - Actor diagram Finture As-is	51
Figure 26 - Overall mortgage chain Actor diagram.....	55
Figure 27 – Actor diagram Finture as-is	56
Figure 28 – Actor diagram mortgage process, without Finture.....	57
Figure 29 – ArchiMate diagram current situation Intermediary using Finture	58
Figure 30 – Actor diagram Mortgage Advice	62
Figure 31 - Activities Mortgage Advice step	64
Figure 32 - Knowledge/information involved in composing advice	65
Figure 33 - Current situation in composing mortgage advices	70
Figure 34 – Actor diagram Offer Acceptance.....	75
Figure 35 - Activity diagram Offer Acceptance	77
Figure 36 - Information involved in Acceptance check.....	79
Figure 37 - Current situation Offer Acceptance.....	81

Figure 38 - Range redesign project Mortgage Advice project86

Figure 39 - Combination alternative logic & data-source configurations88

Figure 40 - Mortgage Advice alt. 1 - Including all logic and data-sources in Finture90

Figure 41 - Mortgage Advice alt. 2 - Logic in Finture, consulting local external data-sources.92

Figure 42 - Mortgage Advice alt. 3 - Logic in Finture, consulting remote data-sources.....93

Figure 43 - Mortgage Advice alt. 4 - Installing advice software on ASP platform.....94

Figure 44 - Mortgage Advice alt. 5 - Invoking web-service advice -software vendor.....96

Figure 45 - Range redesign project Offer Acceptance 104

Figure 46 - Offer Acc. alt.1: Conducting Acceptance Check internally 106

Figure 47 - Offer Acc. alt.2: Conducting acceptance checks internally on local platform 108

Figure 48 - Offer Acc. alt.3: Invoking external acceptance service 109

Figure 49- Architecture recommended situation 119

Figure 50 - Functional decomposition recommended situation. Adopted from [KRA05b] 120

Tables

Table 1 – Definition object of analysis36

Table 2 - Mapping research questions - modelling techniques37

Table 3 - Mapping research questions - other means37

Table 4 - Organizational Entities in Finture environment.....50

Table 5 - Roles Intermediary cockpit52

Table 6 - Impact of change supporting Mortgage Advice with Finture86

Table 7 - Prioritization evaluation criteria Mortgage Advice98

Table 8 - Evaluation alternatives Mortgage Advice.....99

Table 9 - Impact of change supporting Offer Acceptance Check with Finture 103

Table 10 - Prioritization evaluation criteria Offer Acceptance Check..... 111

Table 11 - Evaluation alternatives Offer Acceptance Check 112

1. Introduction

Before focussing on the research this thesis is about, the context of the research is discussed. The Dutch mortgage market, with its specific dynamics, and the Finture application as a response to the shift in responsibilities and concerns occurring in the mortgage market will be described. This background is very relevant in order to understand the Finture developments taking place.

1.1. Background mortgage market

The Dutch mortgage-market has experienced significant changes during the last decade. In both volume and organization, considerable developments took place. The total volume of the mortgage-debt, expressed as percentage of the Gross National Product, increased from 40% in 1990 up to 70% in 2000, and approached 100% in June 2006 [BRO01] [DFT06]. This made the Dutch mortgage-market one of the largest in Europe [BRO01]. During the economical recession in the first years of the new millennium, the mortgage market experienced a decrease (-30% between 1999 and 2001), but had a constant recovery ever since 2003 [GEE05].

Changing market situations, technological developments and new legislation led to a shift in power in the mortgage value chain during since the mid nineties of the last century.

In their article in *Banking&Finance* of March 2004 Kruszel and Van Reenen showed the results of an analysis of external aspects in the Dutch mortgage-market [KRU04]. Figure 1 represents the most important forces they identified.

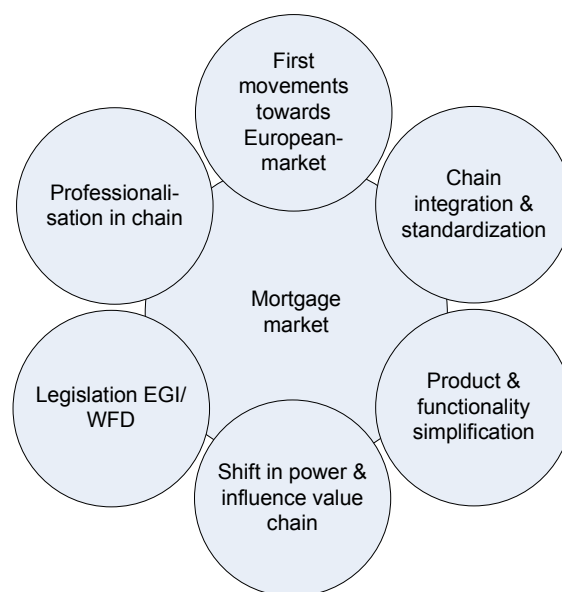


Figure 1 – Force field Dutch Mortgage market. Adapted from Kruszel & Van Reenen

Kruszel and Van Reenen conclude that some of the identified factors, directly led to an increase in the need for automation of information-flows in the chain. Simplification of products, legislation (especially *Wet Financiële Dienstverlening, WFD*) and standardization initiatives on communication-aspects stimulated development towards technical chain integration.

There has been a shift in execution of activities within the chain. Intermediaries gained a substantial market share. Only a few years ago, the majority of the mortgage-production was marketed by large banks [KRU04]. In 2000, intermediaries realized a market-share of over 52% [RIS01]. The total market has an estimated value of €75B. Intermediaries sold 52% of this, receiving a total commission fee of €760M [RIS01]. The trend towards clustering of mortgage-advice organizations towards professional mortgage-advice chains led to a concentration of market-share [KRU04]. In 2000, the mortgage-advice chains and other professional intermediaries (organizations with a substantial mortgage-portfolio [KRU04], [RIS01]) together had a market-share of 35.7% [RIS01]. This concentration of market-share meant a shift in power from the banks towards the mortgage-advice chains and professional intermediaries.

This shift in power developed a force towards specialization and standardization of both product and communication. Specialization and standardization enables intermediaries, marketing a product portfolio consisting of products from several mortgage-providers, to complete their process more uniform, more transparent and faster [BRO01] [KRU04].

Specialization in the value chain implied "untwining" in the chain, where parts of the process in mortgage-distribution are performed by specialized actors [BRO01].

For the near future, a significant shift towards internet-mortgages is foreseen. Whereas currently 1 to 2% of the mortgages is sold via the net, market-analysts expect that within 10 years, 10 to 20% of the mortgages will be sold through the internet [DFT06]. This development will increase pressure on prices for banks and *bricks-and-mortar* intermediaries, reducing their margins. This reduction in margin will stimulate developments regarding operational excellence. Further standardization and integration will improve the throughput and runtime of the process.

Intermediary organizations try to differentiate either on price or service-level. By reducing their operational costs, they can offer mortgages at lower commission fees, resulting in a decreased price for the customers. Other intermediaries focus primarily on delivering a higher service level, as a retort on the upcoming internet-mortgages.

1.2. Background Finture

As a result of the developments in the Dutch mortgage-market, begin 2005 some parties in the Dutch mortgage-market (Kapitaalvisie Financiële dienstverlening, Finag) teamed up with technology specialist Topicus. From this collaboration, the joint venture Finture B.V. originated [KRA05]. Topicus developed and maintains the technical aspects of the Finture platform, whereas the joint venture handles the marketing, sales and operation of the product and its services.

Finture offers an integral platform for intermediaries and mortgage-suppliers. This ASP (Application Service Provider) based platform supports financial services. By linking mortgage-suppliers and intermediaries, the mortgage-suppliers can easily provide their intermediaries with new (versions of) products [KRA01].

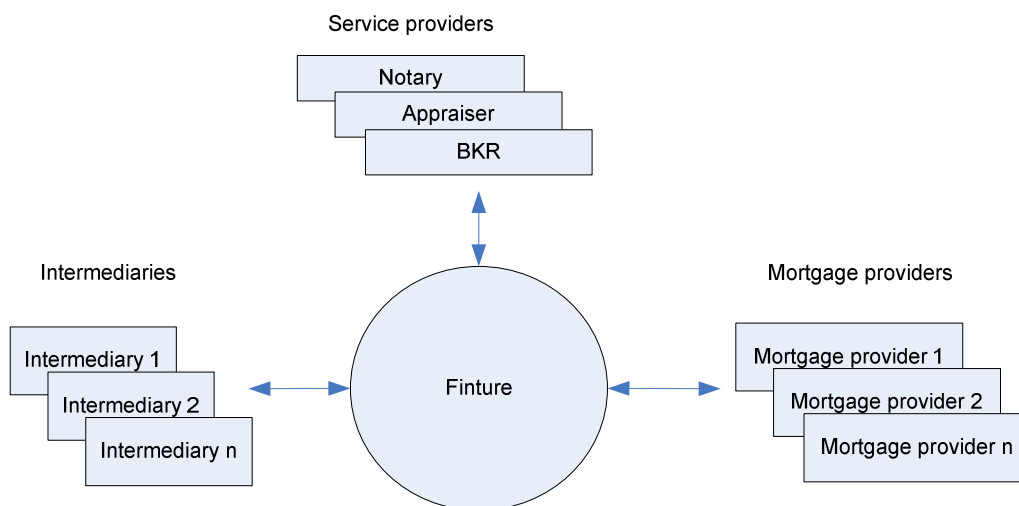


Figure 2 - Finture concept. Adopted from [KRA05a]

Finture supports intermediaries in their primary process, enabling them to administer all the activities required in selling mortgages, and facilitating communication with chain-partners. Finture's functional strategy is to provide full and optimal support for this process and the main supporting processes, all activities between marketing and closing the final deal should be facilitated. This streamlines the primary processes of both the intermediary and mortgage-provider, improves their throughput, reduces their costs and thereby increases their results.

In order to provide a solution that fits every intermediary organization, Finture has a status and process management component. This component enables the intermediary organization to define their specific workflow in the system. By defining status transitions, orders, start and end situations or required documents per process step, the virtual workflow can be adjusted to the actual workflow operated by the organization.

1.3. Background & mission Topicus

Topicus is founded in 1999 and has grown steadily ever since. Topicus consists of several organizations, originating from an innovative core. This innovative core (Topicus B.V.) develops new service concepts, focussed on different markets. When the activities in a market have grown to reasonable volume to operate independently, a new organization is founded. This spin-off organization is specifically focussed on this market, enabling the core to re-start the innovation cycle. Topicus Health-care is founded in 2003, Topicus Education started in 2006 and the Finance spin-off is founded in 2007. At this very moment, Topicus innovation is in the first stage of a new innovation lifecycle. Development of the Finture application and its underlying FORCE framework [FOR06] lies with Topicus Finance. Currently the four main Topicus organizations (Topicus Education, Topicus Health-care, Topicus Finance and Topicus B.V.) consist of approximately 75 employees. Furthermore, Topicus manages around 50 FTE in participations.

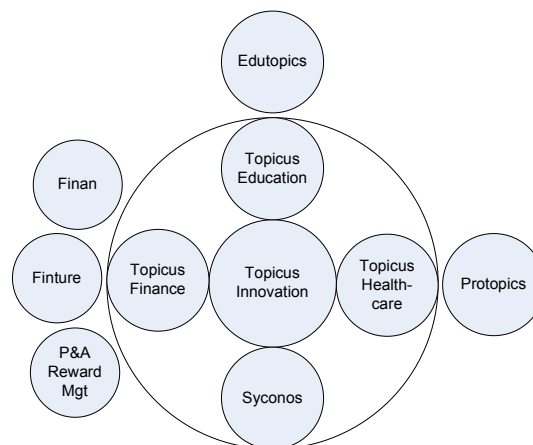


Figure 3 - Topicus organization model

Topicus aims at positioning itself in the market as an innovative ICT service provider. From three locations in the Deventer city centre, Topicus develops new service concepts for the sectors Education, Health-care and Finance. For each of the sectors an individual organization is founded. Topicus Finance focuses on the financial sector and did projects for several banks, insurance companies and intermediaries. Keywords in the Topicus competences are "Software as a Service", "Chain integration" and "Process management". Topicus strives for developing innovative software based on web technology and offered as a service. The operation of the resulting products is not conducted by Topicus itself. As soon as the development is completed, a service organization is founded responsible for marketing and operating the service. Examples of these joint-ventures are Edutopics, Protopics and Finture. This clearly depicts Topicus's core competence and mission, the development of innovative software, not the operation and marketing. Although this project is located at the Topicus Finance organization, a lot of the Topicus B.V. developers work on the Finture/Finance projects. In the remainder of this thesis both 'Topicus' and 'Topicus Finance' are used to refer to the Topicus Finance spin-off.

2. Research outline

This chapter introduces the research. The research motivation and scope lead to the main research question, which is composed of several sub-questions to be answered. The final paragraphs of this chapter describe the methodology and summarize the main literature used.

2.1. Research motive

As defined before, Finture's functional strategy is to support the mortgage intermediary's organization by facilitating (all) communication between intermediaries and their chain-partners and to automate or support all of the intermediary's activities in their primary process. Topicus's role is to maintain and further develop the platform, without acting as a content provider. In rolling out this strategy, Topicus wants a clear insight in the context of Finture as it currently operates. More specifically, Topicus is interested in a thorough analysis of unsupported or deficient (sub) processes taking place in the primary process of the mortgage intermediary. The subsequent question is whether, and if so, how Finture can improve (support for) these activities, creating an increased value for the intermediary organizations.

The main question Topicus has is:

How can Finture better support the business process of the mortgage intermediary?

This improvement may imply an increase of value-add for intermediaries in using Finture.

2.2. Research Scope

Finture is focussed on the intermediary. The primary process of the mortgage intermediary is the collection of activities between the lead generation and ultimately signing the mortgage-deed. When an individual is interested in acquiring a mortgage, he becomes a prospect for the intermediaries/mortgage providers. After signing the mortgage-deed, the prospect is "converted" to a customer. This process is defined as the prospect-phase of the overall mortgage process. The scope of this research is bounded to the prospect-phase of the overall mortgage process, since the other phases fall-outside of the intermediary's primary process and are therefore of less interest for Finture and Topicus. The product development and after-sales parts of the process remain out of scope. Furthermore, this research is bounded at intermediaries already using Finture. The goal is to improve the value-add of Finture, analyzing processes of intermediaries not using Finture would not give a valuable insight in possibilities for improvement.

2.3. Research Approach

2.3.1. Research objectives

This research is focussed on analyzing how Finture can improve the execution of the intermediary’s primary process. The main objective of this research is the identification of deficiencies or unsupported sub-processes in the primary process, and proposing alternatives to overcome these deficiencies. The result strived for is a recommendation on how the next release of the Finture application can offer a better support for the mortgage intermediary’s primary process.

2.3.2. Main research question

Adjusting the main research question as introduced in the research motivation, with the scope, results in the following main research question:

How can Finture better support the prospect-phase of the primary process of a mortgage intermediary?

This will be the main research question for the remainder of this research.

2.3.3. Research goals

In order to answer the main question, 5 distinct research sub-goals can be identified:

It is important to (1) have a thorough understanding of the chain as a whole and the intermediary’s role in it and (2) to have a clear picture of the current position of Finture in this chain. By comparing these two, (3) the deficient or unsupported processes can be identified. Subsequently, (4) these processes can be further analyzed and (5) a design for (improved) support by the platform can be framed.

These research goals have a clear coherence, as depicted in Figure 4. The first three goals are aimed at identifying unsupported processes, which will be input for the two latter goals.

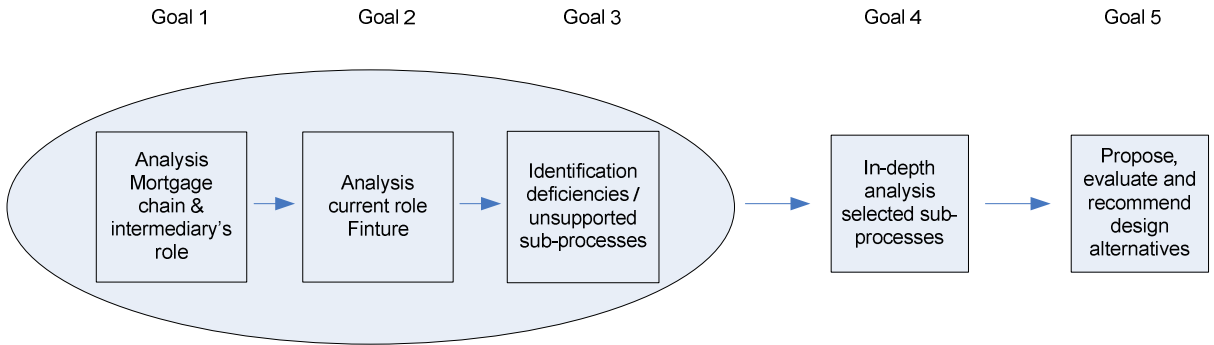


Figure 4 - Coherence research goals

2.3.4. Research questions

In order to be able to answer the main research question, the following research questions have been derived from the five research goals. From each of the five research questions, sub-questions have been derived, required in answering these research questions.

- 1 What approaches and techniques for Business Process analysis and Business Process Support analysis exist according to literature and which of these approaches is best applicable on the mortgage/Finture case?
 - 1.1. What are the basic concepts in business process literature?
 - 1.2. Which approaches in business process analysis exist and how do these approaches relate?
 - 1.3. Which business process techniques exist, and how do these techniques relate to each other?
 - 1.4. How do the business process change approaches and techniques relate?

- 2 Which parts of the mortgage intermediary's primary process and its interactions are currently supported by means of Finture?
 - 2.1. What are the actors involved in the mortgage chain, and what is their role?
 - 2.2. Which information do these actors exchange, by what means?
 - 2.3. Which of the interactions with the intermediary are supported by Finture?
 - 2.4. Which of the sub-processes in the intermediary's primary process are supported by Finture?

- 3 Which of the unsupported sub-processes are most interesting for further analysis on support by Finture?
 - 3.1. Which activities and interactions in the intermediary's primary process are currently unsupported?
 - 3.2. Which of the unsupported activities and interactions can possibly be supported by Finture?
 - 3.3. Which of the unsupported activities and interactions can practically be supported by Finture?

- 4 What are the essentials every design alternative for an unsupported activity should comprise in order to add any value to Finture?
 - 4.1. What is the main purpose of this specific activity?
 - 4.2. Which actors are involved? And which information do they exchange?
 - 4.3. Which knowledge must be available in order to support the activity? And how often does this knowledge change, and how are updates of this knowledge communicated?

- 5 What alternative designs exist for the selected sub-processes or interactions and which of the alternatives is recommended according to the current situation and Topicus/Finture strategies?
 - 5.1. What are the main criteria an alternative should meet? And how are the priorities within the criteria?
 - 5.2. Which alternative solutions can be identified?
 - 5.3. How do the proposed alternatives score when evaluated against the criteria?
 - 5.4. Which of the alternatives is best suitable with respect to the current situation?

2.3.5. Research model

In order to answer the research questions, five distinct steps can be identified. First of all, a literature study on relevant methodologies and techniques for Business Process analysis projects is conducted, and a specific method (the BiZZdesign methodology) is selected for this project (1). Then the analysis approach of this methodology is applied on the specific mortgage/Finture case. This results in an understanding of the overall mortgage chain and Finture as-is (2). Mapping these two, results in a set of sub-processes and interactions that can be (better) supported by Finture. In co-operation with Topicus a subset of these processes and interactions is selected for further analysis and design (3). This is input in the redesign approach of the BiZZdesign methodology, starting with an in-depth analysis providing a thorough understanding of the selected processes (4). This will then be input for the final step, where design alternatives for incorporation are proposed and evaluated (5). This sequence is depicted by Figure 5.

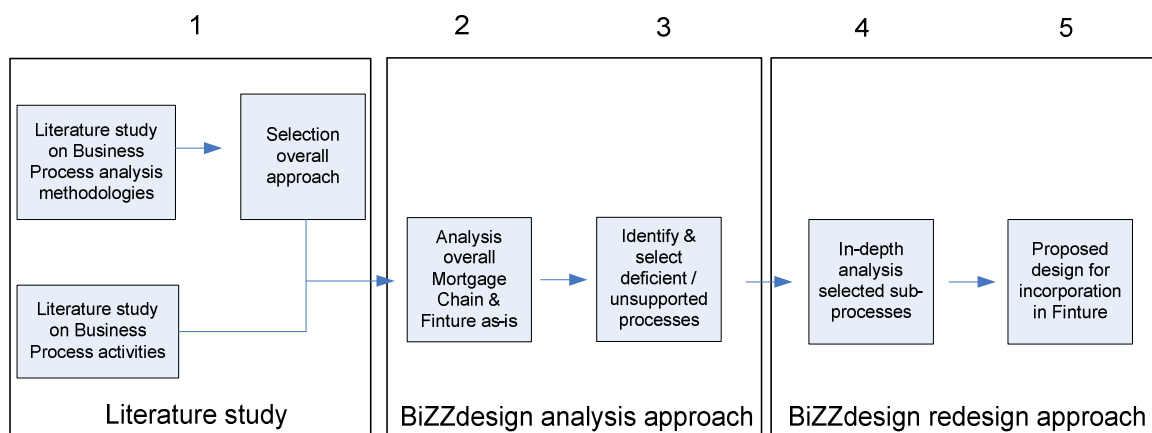


Figure 5 - Research model

2.3.6. Research methodology

As the research model illustrates, this project consists of a combination of a literature study and the application of methodologies found on the concrete mortgage/Finture case. The methodologies will result from the literature study. Information on the mortgage case will be derived from documentation and knowledge available within Topicus and, when needed, by interviewing additional actors in the market.

2.3.7. Information retrieval

Information used in the analysis of the mortgage chain and Finture is derived from interviews with Topicus management, consultants and developers and documentation on the mortgage market and intermediary organizations offered by educational institutions. Additionally, design documents on Finture, FORCE (both technical and functional) and supported communication standards is used to get an understanding of the system as-is and the possibilities in extending the Functionality.

2.4. Synopsis theoretical background

A literature study on Business Process research showed that Business Process Change is a container term for projects aimed at analyzing business processes with an ultimate goal of improving its structure, execution or support. This support aspect makes BB Change relevant for this research. A variety of Business Process Change approaches exist, which can be categorized as either re-engineering (radical change) or improvement (evolutionary change) approaches. Although the main research question is not explicitly aimed at process re-engineering, the BP Change approaches showed to be relevant in approaching this problem due to their focus on IT-enabled processes. The main research question is classified as a BP re-engineering type issue, requiring a BPR approach. As a generic approach, the BiZZdesign approach is adopted. In determining the means to analyze this specific case, an analysis of available BPR activities is conducted. A wide variety of these activities exist. These activities are positioned according to their BPR-project stage and the organizational level they apply on. This Stage-Level framework is also used to position the research questions and modelling techniques. Combining these models led to the identification of means in analyzing the Mortgage/Finture case. The next chapter presents this theoretical background in more detail.

3. Theoretical background Business Process Literature

The first research question is aimed at selecting an approach for analyzing the mortgage chain and the intermediary's situation. Since Finture is aimed at supporting the intermediary's primary process, the starting point is Business Process literature. This chapter presents an overview of literature on Business Process (BP) literature. Starting with defining several generic BP concepts, an analysis of general BP change approaches is discussed. After these generic approaches, several activities within BP change projects are discussed and positioned in the Stage-level framework, indicating their role in a BP change project. This Stage-Level framework is later used to derive concrete means in analyzing the mortgage chain.

3.1. Introduction

When reading literature on Business Processes, one can easily get overwhelmed with the variety in Business Process terms and labels; BPR, BPI, BPT, BPS, BPA, BPM are just a few of them, mostly with multiple meanings. Many authors use a BP* label to denote a specific movement or aspect of the business process research field and propose a new BP* abbreviation as a label in order to distinguish their findings. This leads to a large variety of abbreviations. In order to be able to select the right methodology for the analysis of the mortgage intermediary process, the first step is analyzing the different movements in, and aspects of Business Process research.

The following section will discuss a subset of the several BP* labels encountered in the literature study. For each of the terms, a definition is given. This definition is not the result of an exhaustive analysis of all definitions available in literature, but rather an overview of most encountered definitions. After discussing the definitions, a comparison between the several terms is made, leading to an overview and classification of the BP* terms and their mutual relations. This overview forms the input in selection of an approach and methodology in analyzing the mortgage intermediary's process.

In Business Process literature a distinction is recognized in research on generic Business Process change approaches and activities within the BP change trajectories.

Examples of BP change approaches are: BP Change, BP Re-engineering, BP Redesign, BP Improvement, BP Innovation and BP Re-generation.

Examples of activities within the change trajectories are: BP Analysis, BP Architecting, BP Mining, BP Modelling, BP Mapping, BP Simulation, BP Tactics, BP Support, and Business Activity Monitoring.

The following sections define the approaches and activities, with their mutual relations.

3.2. Business Process & Workflow

The terms Business Process and Workflow are frequently used as synonyms, as are Business Process Management (System) and Workflow Management (System). However, quite some difference exists in the definitions of these terms. This section will present a distinction based on definitions. This section concludes with a graphical representation of the relations between the terms discussed.

Business Process

The analysis of Business Process research fields starts with a definition of business processes in general. Many authors define a business process (BP) in similar terms, indicating a collection of activities, in a particular order, leading to a specific outcome.

The most basic definition encountered is that of Davenport & Short [DAV90]. They state that a Business process is:

"a set of logically related tasks performed to achieve a defined business outcome."

This basic definition is extended by several authors. Dalmaras states that the definition should address the distinct beginning and end states of a process. According to Dalmaras, contemporary definitions mostly address the ability to communicate and interact with other processes and the notion of a valuable outcome [DAL06]. The definition he proposes is valid for contemporary IT-enabled and networked processes, but is less generic than the Davenport & Short definition. Since the Finture/mortgage case describes a contemporary IT-enabled and networked situation, the definition of Dalmaris is very appropriate.

(Business) Process Instance

When a Business Process is executed, process instances represent the operationalized conceptual business process. A Process Instance is defined by the Workflow Management Coalition WfMC as [WFMC99]:

"The representation of a single enactment of a (business) process."

A process instance is treated as a synonym for 'case' by the WfMC [WFMC99].

Workflow

The Workflow Management Coalition defined Workflow as [WFMC99]:

"The automation of a business process, in whole or part, during which documents, information or tasks are passed form one participant to another for action, according to a set of procedural rules."

Thus, the workflow can be seen as the virtual representation (or "implementation") of a business process.

The WfMC uses Workflow Management, Workflow Computing and Case Management as synonyms for Workflow.

Workflow Management (System)

The Workflow Management Coalition treats Workflow and Workflow Management as synonyms and do not propose an individual definition for WfM. Instead, they proposed a definition for WFM systems. This definition is [WFMC99]:

"A system that defines, creates and manages the execution of workflows through the use of software, running on one or more workflow engines, which is able to interpret the process definition, interact with workflow participants and, where required, invoke the use of IT tools and applications."

Using this definition, the Workflow is the operational-level solution to accomplish a certain business process by means of concrete instances of the process. Workflow Management is the operational management of concrete instances of the business process. A workflow management system is "initialized" by the business process. The workflow managed by the WfMS is specified by the business process and its specific constraints and conditions.

Business Process Management

Van der Aalst et al define Business Process Management as [AAL03]:

"Supporting business processes using methods, techniques and software to design, enact, control, and analyze operational processes involving humans, organizations, applications, documents and other sources of information."

This explicit notion of technical means and software is not necessary according to Dalmaras. He concluded that Business Process Management is not automatically involved with technology, thus it can better be defined generically as [DAL06]:

"A set of managerial activities and responsibilities aimed at designing, executing, and adapting business processes in accordance with the organisation's objectives."

Business Process Management is thus involved with keeping the business processes and organizational objectives and goals aligned. Elzinga et al. state that any structured approach used to analyse and continually improve core processes of an enterprise's operation can be classified as Business Process Management [ELZ05]. Within Business Process Management several distinct activities can be identified, like: Identification, Modelling, Analysis and Innovation [ELZ05].

3.3. Relation Business Process & Workflow concepts

Figure 6, graphically depicts the relation between the several general Business Process and Workflow concepts.

Business Process Management is the top-level concept, responsible for aligning the actual operation with the corporate strategy. This activity manages the (daily) operation of an organization, specifying the sequence and constraints on activities to be taken. This sequence is the Business Process. This Business Process definition is used in implementing a Workflow Management System, checking and coordinating actual executions of the Business Process by means of automation. A virtual execution of the business process is the workflow, which facilitates the actual instantiation of the business process.

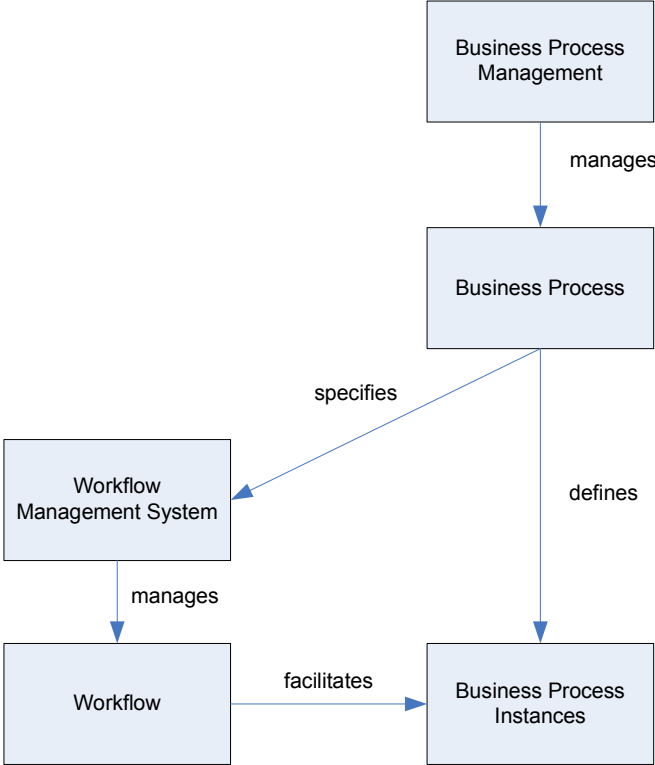


Figure 6 - Relations Business Process & Workflow (Management) concepts [WFMC99]

The Business Processes Instances are the concrete executions of the process that have to be supported by means of automation. In the Finture case, these instances are the customer-propositions [KRA05a] that flow from initial contact to provided mortgage. According to this figure, Finture acts as a Workflow Management System for the Intermediary organization. In analyzing the fit of the WfMS, the business process should be analyzed. According to literature, Business Process Change approaches provide a structured approach to analyzing business processes.

3.4. Business Process Change approaches

According to Harmon Business Process Change is a container term for projects aimed at analyzing business processes with an ultimate goal of improving its structure, execution or support [HAR03]. This analysis of processes in order to create a better execution by realizing a better support maps directly to the main objectives of this research. Therefore this concept of Business Process Change is relevant. This section describes several approaches in Business Process Change projects. The different approaches will be compared and a general distinction between the approaches will be made and graphically depicted.

Business Process Change

Business process change simply refers to any change in the (operational) process of an organization [HAR03]. Business Process Change is mostly seen as a generic form of Business Process Innovation and Business Process Improvement in all their variances [HAR03].

Business Process Improvement

According to Harrington, Business Process Improvement refers to making business efficient, effective, and flexible to meet customer expectations in products and services [HAR91]. This is a general and high-level definition of the term and brings the focus on the desired effects of business process improvement. To complement this, Harmon highlights the fact that improvement is incremental as opposed to radically discontinuous and originates from the Total Quality Management field [HAR03]. In Business Process Improvement the awareness of quality of the processes is embedded in the organization. Combining this, results in the notion that:

"Business process improvement focuses on continuously incrementally improving processes to better reach organizational goals."

Business Process Optimization can be seen as a synonym for Improvement.

Business Process Innovation

The term Business Process Innovation is introduced by Davenport. He referred to Business Process Innovation for changes to business processes with major shifts [BAR95]. In literature, the terms Business Process Innovation and Business Process Reengineering with all its variances are frequently used as synonyms for the phenomena of radical change to business processes. The next sections will discuss the several approaches with this radical character.

Business Process Design

Kettinger and Teng refer to BP Design as a major effort that is undertaken to design a new process [KET00]. This design can either be independent or within the broader context of a BP redesign project [KET00].

Business Process Redesign

The term Business Process Redesign is introduced by Davenport and Short [DAV90]. They define it as:

"The analysis and design of workflows and processes within and between organizations"

Kettinger and Teng define this term as "the critical analysis and radical redesign of existing business processes to achieve breakthrough improvements in performance measures" [KET00].

Business Process Engineering

Elzinga, Gullidge and Lee call the assessment of ways in which an enterprise can improve productivity, product quality and operation Business Process Engineering [ELZ05].

Franken et al present an historical overview of Business Process Redesign. They conclude that with the occurrence of (architectural) methods and tools to support organizations in optimizing processes and introducing customer focus, Business Process Redesign has moved from an ill-understood skill to a repeatable exercise. They call this latter and more mature stage Business Process Engineering.

Business Process Reengineering

Hammer and Champy, champions of the reengineering concept, give a general definition for Business Process Reengineering:

"Reengineering is the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service, and speed."

Barothy et al combine this general definition with Venkatraman's opinion that IT is the single most important lever and propose the following definition for Business Process Reengineering [BAR95]:

"[...] we define BPR as a complex, top-down driven and planned organizational change task aiming to achieve radical performance improvements in one or several cross-functional, inter- or intra-organizational business processes whereby IT is deployed to enable the new business process(es)."

Since practically all of reengineering processes as discussed in literature involve IS/IT solutions, this latter definition is very appropriate and will be adopted for the remainder of this thesis.

Stoica et al introduce Business Process Reengineering as [STO03]:

"Business Process reengineering (BPR) is the redesign of business processes and the associated systems and organizational structures to achieve a dramatic improvement in business performance."

This definition introduces "reengineering" and "redesign" as synonyms. This similarity is also recognized in the "radical" characteristic of change in both approaches.

Since 1) Franken et al see BP Engineering as the more mature form of BP Redesign, 2) BP Design can be seen as a part of BP Redesign, and 3) BP Reengineering and BP Redesign are considered synonyms due to their radical characteristics, these four concepts can be treated as one. Besides these four terms several other exist (i.e. Core Process Redesign, Business Process Transformation, Breakpoint Business Process Redesign), all referring to radical changes in business processes.

Since the term Business Process Reengineering is mostly used, this term will be used in the remainder of this thesis and seen as a top-down approach in establishing new business processes in order to create a radical increase of the business performance.

Business Process Re-generation

The Business Process Re-generation term is introduced by Kettinger and Teng to refer to strategy driven business process change. In their opinion, strategy driven business process change begins with "generation" and "cultivation" of innovative strategies. It has more to do with integrating a business process view into strategic development, than it does with "engineering". Therefore they declare the R in "BPR" as Re-generation rather than Re-engineering [KET00].

Question is whether this differs from Business Process Reengineering except from the trigger. Re-generation is strategy-based, whereas Reengineering might as well be operation-based. The activities within a Re-generation project do not differ significantly from the Reengineering projects, and are therefore considered equal except from their triggers.

Business Scope Redefinition

Business Scope Redefinition is the most revolutionary level of IT-enabled business transformation according to Venkatraman [VEN94]. In Business Scope Redefinition, strategic adjustments like the concentration on core competences as well as the expansion of business functions (new products or services) are defined. Venkatraman states that this level of transformation is directly involved with the (adjusted) position of an organization in the Business Network. The consequence of this scope redefinition is the re-alignment of the organizational processes with the new strategy. This is a Re-generation and thereby Re-engineering approach.

Business Network Engineering

Franken et al advocate that Business Networks are the horizontal integration of Business Processes beyond organizational boundaries [FRA00]. In designing networked business processes it is essential to take a "from customer, to customer" paradigm, they state. In applying this paradigm, there is no essential difference in Business Process Engineering and Business Network Engineering. Departments and external companies can both be seen as chain-partners in the process [FRA00]. Adopting this paradigm, the methodology in process analysis and modelling as introduced by Franken et al (Testbed/BizzDesigner) can be used for Business Network Engineering. However, regarding coordination, business networks are significantly more complex and require additional coordination mechanisms to be defined.

Business Network Redesign

For the Business Network field, the same ambiguity occurs as with Business Processes. Several synonyms exist for the Design/Engineering approaches. The Business Network Redesign term, as introduced by Venkatraman as level 4 of his IT-enabled business transformation levels, is a reorganization process that [VEN94]:

"[...] spills over the boundaries of the organization and integrates value chains of the customers and suppliers."

Without going into detail, the line of reasoning presented in the Business Process Reengineering section seems valid for the Business Network field. Hence, the term Business Network Reengineering seems most appropriate for the concept of analysis, modelling and innovating and evaluating networked processes.

Furthermore, when both Business Process Reengineering and Business Network Reengineering are involved with analysis, modelling, and innovation of value chains with a "from customer, to customer" paradigm, and external chain-partners can be seen as internal departments [FRA00], these concepts can be considered similar. Davenport and Short indicated this similarity by addressing the "within or between organizations" aspect in their Business Process Redesign definition.

This thesis will not make a distinction between networked processes and internal processes. The term Business Process Reengineering (BPR) will be used for both.

3.5. Conclusions on Business Process Change approaches

Although there is a large variety in terms regarding Business Process Change projects, in fact there is only one major distinction. Business Process Change can be divided into projects with radical changes and projects with incremental changes, as represented by Figure 7. According to Franken et al, business processes and business networks tend to converge as far as modelling and analysis activities are concerned. Therefore, this distinction is becoming less relevant for the scope of this thesis.

The drivers for the change projects are not very relevant in this distinction. However, strategy-driven (Top-down) change processes are more likely to result in radical changes, whereas more tactical or operational (Bottom-up) driven projects can very well result in incremental changes.

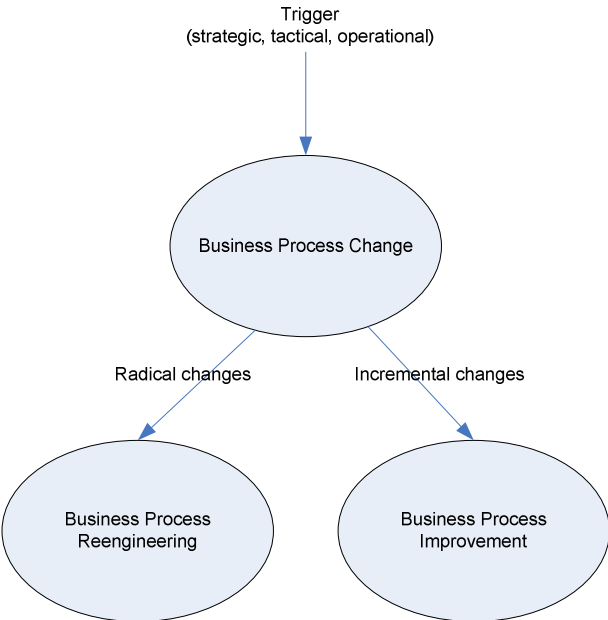


Figure 7 - Essential Business Process Change projects

BP Improvement projects tend to be rather narrow regarding analysis outside the existing process or organizational borders. In an objective and unbiased analysis of the chain as a whole and the organization’s role in this chain, the analysis concept of a top-down approach is more appropriate. Therefore the analysis of the mortgage chain and Finture is conducted using a Business Process Reengineering approach.

3.6. Positioning Framework BPR activities & techniques

The following sections discuss several activities and techniques claimed to be part of Business Process Reengineering trajectories, like: BP Analysis, BP mapping, BP mining, BP Tactics, BP Simulation, Business Activity Monitoring and many others. This is not an exhaustive list of all available activities within an engineering project, but an overview of research fields introduced in the Business Process field in the last years. This list is in no particular order. Besides the activities listed, several activities are omitted since there was no relevant literature on these topics. Examples of these are: Business Process Prioritization, Business Process Discussion, Business Process Linkage and Business Process Reporting. In order to get an understanding of the activities listed, a discussion of definitions will be presented. Furthermore, the activities will be positioned in the Stage-Level framework depicting the phase of a generic BPR trajectory they occur in, as well as the operational level the activities apply on.

3.6.1. Stage-Level framework

Muthu, Whitman and Cheraghi analyzed several contemporary methodologies for conducting Business Process Reengineering projects and composed a consolidated BPR methodology. This methodology can be seen as an aggregation of the several methodologies they studied and consists of the following phases [MUT99]:

1. Prepare for reengineering
2. Map and Analyze As-Is process
3. Design To-be process
4. Implement reengineered process
5. Improve continuously

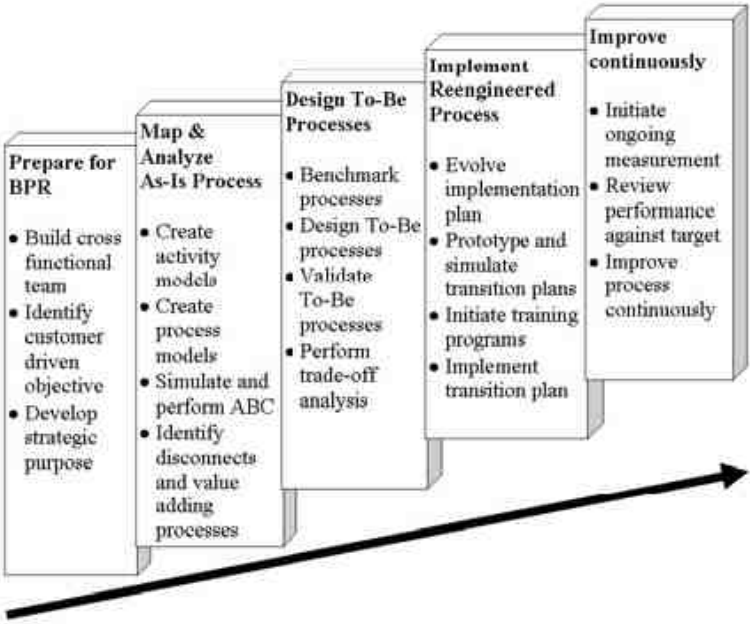


Figure 8 - Consolidated BPR methodology [MUT99]

Several other authors, not included in the research of Muthu et al, propose methodologies with similar phases, like for instance the Stage-Activity framework for reengineering as proposed by Kettinger et al [KET97]. In this Stage-Activity framework, the following stages are identified [KET97]:

- Envision Involves a BPR project champion engendering the support of top-management
- Initiate Encompasses the assignment of a reengineering project team, setting performance goals, project planning and employee/stakeholder notification and “buy-in”
- Diagnose Documentation of current processes in terms of attributes such as activities, resources, roles, IT and costs
- Redesign A new process is designed, fitting the strategy and HR/IT architectures
- Reconstruct The management of change from the existing situation to the newly defined situation
- Evaluate Monitoring of new situation, determining if goals are met and linkage with organization’s management programs

The latter five of Kettinger’s stages can be mapped directly on the titles of Muthu’s phases. Each of Kettinger’s stages consists of several activities, as do the consolidated BPR approach phases. The abstract character of the stage-titles of Kettinger’s S-A framework makes it very well suitable to categorize the different Business Process Reengineering activities. These latter 4 stages map 1 on 1 to the business process lifecycle as defined by Georgakopoulos and Tsalgatidou [GEO98].

They define the process lifecycle as:

1. Capturing Process Definition
2. Reengineering a Process
3. Implementing a Process
4. Performing Continuous Process Improvement

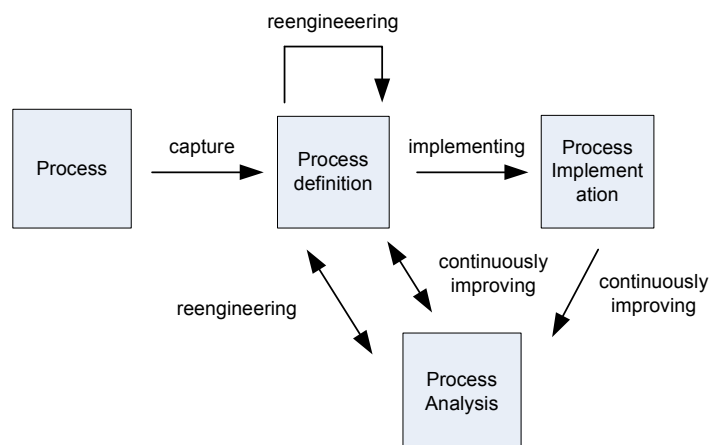


Figure 9 - Business Process Lifecycle [GEO98]

The capturing step of Georgakopoulos is involved with getting an abstract understanding of the process, in order to analyse or implement it. This maps directly on Kettinger's Diagnose stage. The *reengineering* step is Redesign in terms of Kettinger, creating a radically new or adjusted version. The *implementation* step in the lifecycle is, like the Reconstruct stage involved with implementing the new version of the process in the organization and automation-means. The Evaluation stage at last shows great resemblances with the *Continuously improving* step, measuring the process and its execution at run-time, initiating new iterations of the lifecycle.

Comparing the Stage-Activity framework and the Business Process Lifecycle with the Information Systems Lifecycle as proposed by Avison et al [AVI92], the three concepts show strong resemblances.

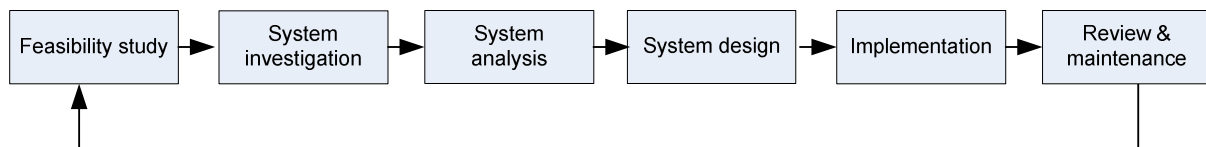


Figure 10 - Information System Lifecycle [AVI92]

Again, the latter 4 phases map 1:1 on the Stage Activity framework. Analysis, Design, Implementation and Review & Maintenance of the IS lifecycle are equal to Diagnose, Redesign, Reconstruct and Evaluate in terms of the S-A framework. The first two phases are the triggering and initiation phases preparing the reengineering project [AVI92].

This means that the overall phasing presented in the Stage-Activity framework can be used in analysis and redesign of business processes as well as information systems. This makes it very appropriate for this research.

Since reengineering approaches are generally defined as top-down approaches, these initiatives start at the organization's strategy. Based on the strategy, processes are designed, defined and implemented. This means that the activities within the trajectory apply on several organizational levels in the organization, hence the top-down classification.

The several activities found in BP literature differ a lot, in their position in a stage of a Reengineering trajectory as well as in the organizational level they apply on.

In literature on management, three main organizational levels are identified: Strategic level, Tactical level and Operational level. These levels differ in the hierarchy of the organization and the specificity of the information and procedures applicable. In general, the strategic level determines the overall strategy of the organization, formulating the long term goals. On the tactical level several short-term objectives are defined and planned in order to meet the long-

term goals. Finally, the operational level represents the main process of the organization, actually creating the value. In order to have a clear understanding of an activity and to be able to select a proper activity within a Reengineering project, it is important to have an overview of the 'position' of every activity with respect to the BPR stage and organizational level. This differentiation is recognized by Jonkers and Franken [JON96]. They state that:

"we need techniques to model business processes at different abstraction levels."

For the overview of activities and their abstraction level, it is interesting to extend Kettinger's Stage-Activity framework with an organization-level axle, placing the activities in this solution space, depicting their role in (one of) the stages and their abstraction level. The extended framework will be entitled as Stage-Level framework (S-L framework), describing the relation of (a) BPR stage(s) and organization level(s) activities apply on. Figure 11 represents the Stage-Level framework.

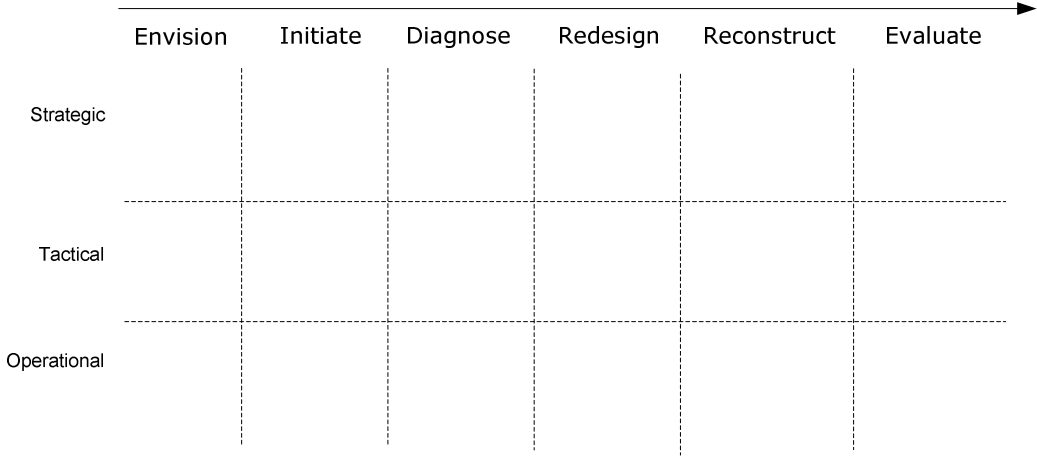


Figure 11 - Stage - Level framework

In the following section this framework will be used to position activities within BP change projects, the research questions of this project and modelling techniques. Mapping these diagrams will enable identification of means in analyzing the mortgage/Finture case.

3.7. Analysis BP Change activities & Techniques

This section discusses several activities that can be conducted within Business Process Change projects. Position these activities in the Stage-Level framework enables identification of means for the mortgage/Finture case.

Business Process Modelling

Schmidt defines a Business Process Model as [SCH03]:

"[...] a representation of the company's operation or a specific part of the operation. It is usually a graphical depiction of the structure and activities of the operation. The model often shows the relationships between work steps and their sequence portraying workflow".

Lin et al state two main roles of Business Process Modelling within Business Process Reengineering trajectories, being [LIN02]:

- to capture existing processes by structurally representing their activities and related elements; and
- to represent new processes in order to evaluate their performance.

Barjis sees a business model as a means to answer the question: "who is offering what to whom and expects what in return". His general definition of Business Process Modelling is [BAR01]:

"Depicting all identified (essential) transaction types, as well as the causal and conditional relationships between them."

As Lin states it, Business Process Modelling is used for understanding existing situations, and developing new situations. In terms of the S-L framework, modelling is both a Diagnose and Redesign activity. Modelling takes place at various levels, using various techniques. Modelling an overall value chain is a strategic activity, like in defining an organization's role in a business network. Modelling a process flow can be seen as a tactical-level action, whereas an information flow is very concrete and operational-level oriented. This means modelling can occur at any level in the Diagnosis and Redesign stages of a Reengineering project.

Business Process Architecting

A Business Process Architecture is defined by Biemans as the [BIE01]:

"arrangement of function and feature that achieves a given objective"

Harmon refers to Business Process Architecture as [HAR03]:

"It is the business process architecture that defines how the various business processes work together to create value. It is also the key to linking the organization's strategic goals to process goals and then to specific manager's goals."

The term Business Process Architecting is defined by Biemans as [BIE01]:

"the high-level, functional design of business processes"

Business Process Architecting is a very high-level activity, composing and aligning a set of business processes based on the corporate strategy. In terms of the Stage-Level framework architecting is a Design-stage activity, on the strategic level.

Business Process Analysis

Ward and Peppard define business process analysis as [WAR03]:

"A technique for assessing the effectiveness of core business processes in support of business objectives and drivers from one or a number of SBUs, or from specific business areas within a SBU."

This analysis can be either quantitative or qualitative, depending on the specific aspects to be analyzed. For now there is no scope applied on the analysis as such.

The analysis of processes is a Diagnose-stage activity, identifying deficiencies or hurdles in the process. Since the analysis can be both quantitative and qualitative, and business processes occur at any organizational-level, BP Analysis applies on all levels.

Business Process Mapping

In his article on reviewing Business Process Analysis approaches, Biazzo defines the concept of "trying to understand a process by building up a map means highlighting, graphically, in a model, the relationship between activities, personnel, information and objects involved" as process mapping [BIA00]. This definition consists of two key phrases, "understand a process" and "building up a map [...] in a model". This places BP Mapping as an analysis and modelling activity. Since both BP Analysis and BP Modelling are already covered, BP Mapping does not

contribute significantly. Therefore BP Mapping is considered a combination of Modelling and Analysis in the Diagnose and Redesign stages and will not be positioned individually in the S-L framework.

Business Activity Monitoring

"Business Activity Monitoring" is a term first used by Gartner, indicating how an organization can provide real-time access to critical business performance indicators to improve the speed and effectiveness of business operations.

BAM is intended to gather information from several sources (multiple application systems and other internal and external sources) enabling a broader and richer view of business activities [MCO02]. Business Activity Monitoring is seen as an emerging area within Business Process Analysis [AAL04]. BAM is involved with extracting information from the process, this can either be on the tactical (costs, sales, production statistics) or on the operational level (lead-times, availability resources).

Business Process Auditing, originating from the knowledge management field, can be seen as a synonym, since BP Auditing refers to [RHEM]:

"examining activities to verify that inputs, actions and outputs are in accordance with defined requirements"

The examination aspect of auditing can be treated as monitoring. The comparison with norms (requirements) is the assessment of performance indicators of BAM. BAM is focussed at analysis of the business in order to discover possibilities to enhance the performance. In terms of the S-L framework this can be classified as a diagnose-stage activity on the tactical and operational levels.

Business Process Mining

Business Process Mining is the activity of extracting information about processes, or derivation of process models from process transactions logs [AAL03]. BP Mining is a synonym for Business Process Discovery.

Process mining is a tool within the BP Analysis activity [AAL03]. An emerging term around the BP Mining field is Business Process Intelligence, aiming at the combination of data-mining and data-warehousing activities conducted within analyses. The transaction logs are generated at the operational level of an organization, in the main process. Therefore this is an operational-level diagnosis activity.

Business Process Tactics

According to Tarumi et al, Business Process Tactics can be seen as the tactical level of Business Process Reengineering.

"BPT is like a lower level manager's job, while BPR is like a senior manager's"

Business Process Tactics is an activity that tries to optimize each workflow process instance by acquiring the necessary resources and considering the priority relative to other instances [TAR97]. This is an activity in the implementation, or reconstruction of the new process.

Business Process Support

Schmidt defines the creation of instances of Business Processes and their execution, 'support of business processes' [SCH03]. According to Stromaier, Business Process Support addresses two main aspects:

1. Employee-level: Here the term refers to role-oriented, technological support for knowledge workers in their daily knowledge intensive business processes
2. Organization-level: Here, business process-supportive refers to support for the effective execution of networks of business processes [STR05].

Both aspects apply on providing an organization with a (technical) infrastructure for realizing and operating their business processes. Since IT plays a significant role in modern BPR trajectories, BP Support is not just an implementation activity, but also in redesigning processes IT possibilities play a key role. This makes BP Support a design and reconstruction activity on the operational organization-level.

Business Process Management

Business Process Management, as introduced in section 3.2, is involved with guarding the alignment of the business process with the organization's objectives. Within this broad definition, several activities exist. However, the generic BP Management process is seen as a strategic activity in the evaluation (post-implementation) phase.

Business Process Simulation

Business Process Simulation, as Tumay states, embodies the concept that a business is a series of logically connected, and that these processes consist of activities that convert input into output. A Business Process Simulation model realistically captures the resource constraints, decision rules, and stochastic behaviour of real-world situations. Executing these models enables testing of the new process without explicitly implementing it [KIM03]. Simulation can be used to evaluate and select upon several design alternatives. This means BP Simulation is a Redesign-stage activity. Since it simulates the process considering constraints (on for instance resources), BP Simulation is an operational-level redesign activity.

Business Process Benchmarking

Business Process Benchmarking refers to the comparison of processes between organizations, determining best practices and identifying possible adjustments. Benchmarking is seen as a strategic activity in the “run-time” phase of a business process.

Business Process Validation

Business Process/Workflow Validation is a term which has an extensible scope, encompassing everything from syntax checking and structural validation and verification at build-time to analysis of live workflow processes in the production environment at build-time, simulation-time and run-time [SCH03]. These three phases (build-time, simulation-time and run-time) can be interpreted as the Redesign, Reconstruct and Evaluate phases of the S-L framework.

3.8. Activities, research questions and techniques in S-L framework

This section depicts the positioning of the several activities discussed in the previous section in the Stage-Level framework. Furthermore, the research-questions and modelling techniques are positioned in this framework. Combining these three diagrams enables identification of means to be used in answering the research questions.

3.8.1. Positioning BPR-activities

Placing all the BPR activities discussed in the previous sections in the Stage-Level framework, results in the overview depicted in Figure 12.

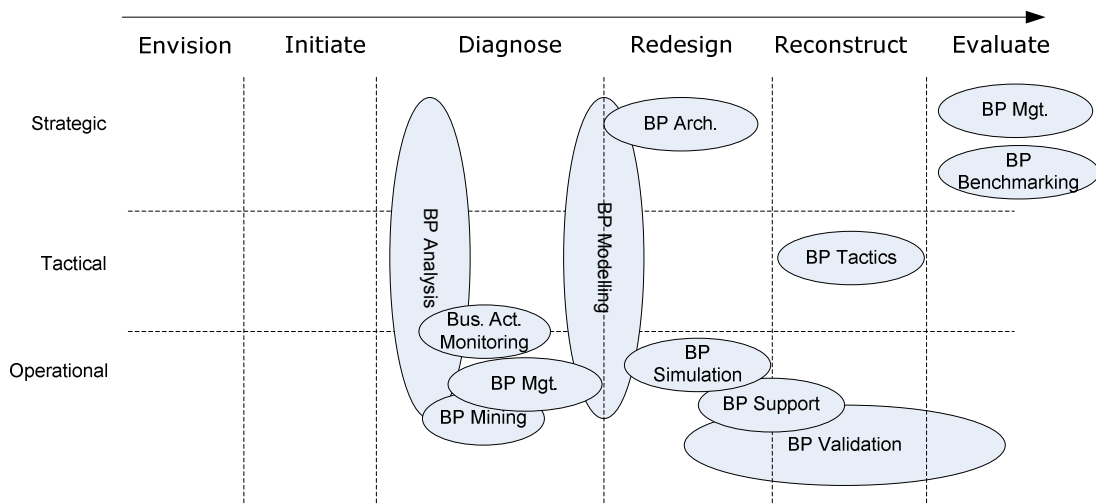


Figure 12 - Positioning BPR activities in Stage-Level framework

This figure shows that all BPR activities discussed apply on the latter 4 stages of the BPR trajectory. This may seem strange since the first 2 stages are also BPR stages. However, these stages consist of getting ideas and commitment for innovation (Envision) and project definition and management of the change project (Initiate). These activities are not

specifically bounded to Business Process projects but are merely generic project (management) activities. Therefore there is no specific literature on these activities in business process context. This conclusion is supported by the Business Process lifecycle as discussed in 3.6.1. This lifecycle only contains the latter 4 stages. The first two stages of the Stage-Level framework are not specifically bounded to business process related projects.

3.8.2. Positioning Research questions

In order to be able to select which of the BPR-activities could be useful in this project, the research sub-questions (as introduced in 2.3.4) are positioned in the Stage-Level framework.

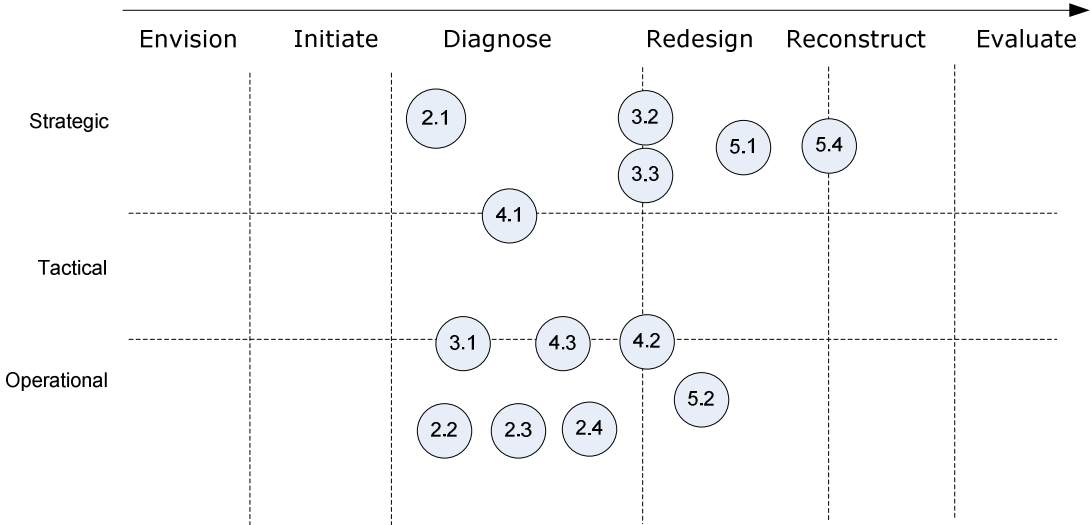


Figure 13 - Positioning research questions in S-L framework

Without going into detail on why the questions are positioned this way, it is clear that the questions formulated are (primarily) classified in either the Diagnose or Redesign stages.

This diagram presents a similar picture as the BPR-activity diagram of Figure 12. This means the research questions are likely to be answered by the positioned activities. Mapping the BPR-activity and research question Stage-Level diagrams will pinpoint the activities to be useful in answering every research question.

The main research question aims at analyzing how the business process can be better supported, in order to provide alternatives for this support. This explains why the sub-questions mainly map to the Diagnose and Redesign stages. Concerning this positioning, the set of BPR activities found is likely to suffice in answering the questions.

3.8.3. Positioning Modelling techniques

Further analysis of the BP activities as discussed in section 3.7 is conducted on the several modelling techniques (possibly) used in these techniques. Figure 14 positions the different modelling techniques that can be used in the BPR activities in the Diagnose and Redesign stages. The other stages are omitted since the research questions all fall in these two stages. This set of modelling techniques is not exhaustive, simply because an exhaustive overview would cover the whole diagram and would be of no use. This diagram positions a set of suitable generic modelling techniques. The selection of specific techniques to be used depends on the case and availability of overall BPR-approach and/or tools.

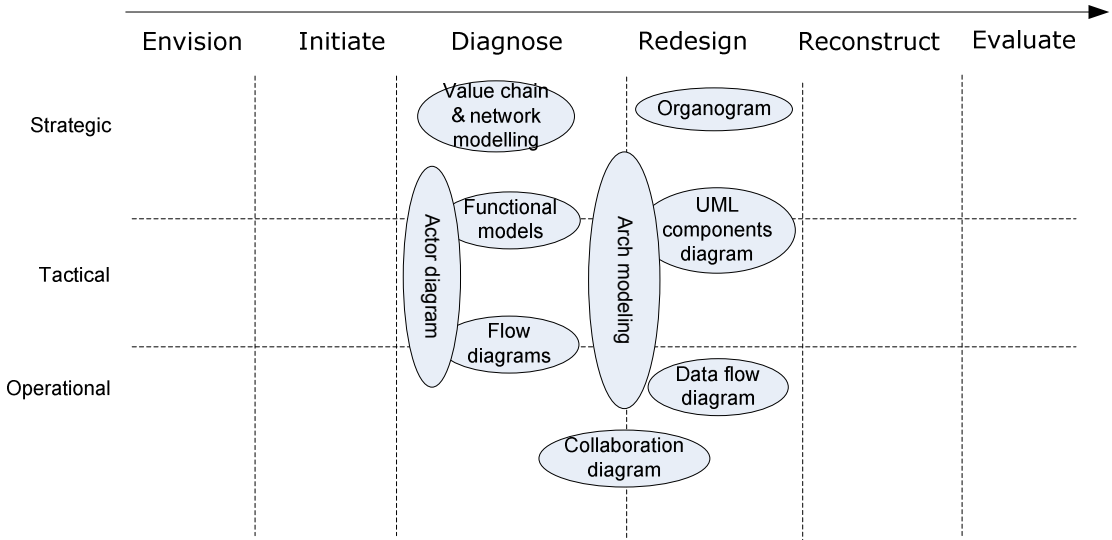


Figure 14 – Positioning Modelling techniques in S-L framework

By combining the three S-L diagrams, the activities and modelling techniques to answer the research questions can be discovered. Section 5.2 will elaborate on this.

This chapter defined the main concepts in Business Process literature. Business Process Change is defined as a container term for projects aimed at analyzing business processes with an ultimate goal of improving its structure, execution or support. This support aspect is very relevant with respect to the main research question. Therefore this BP Change concept is adopted for the remainder of the literature analysis. An analysis of Business Process Change approaches and activities within these change projects pointed out that Business Process Change can be divided in radical ('reengineering') and incremental ('improvement') change projects. For the mortgage/Finture case, the fundamental analytical aspects of reengineering (BPR) approaches are most interesting. This led to the selection of BPR as the general concept for the analysis of the mortgage/Finture chain. The next chapter will select a specific BPR approach.

After the selection of Business Process Reengineering as overall approach, an analysis of various activities within BPR projects is conducted. The activities with their mutual relations are defined and subsequently their position in a stage of a Business Process Reengineering project and the organizational level they apply on is depicted in the S-L framework.

The research questions proposed in section 2.3.4 of this thesis and various modelling techniques are also positioned in the same framework, enabling the identification of means of analysis in a later stage in this thesis. The next chapter discusses the selection of a specific BPR approach, thereby answering the first research question.

4. Selecting BPR Approach for Mortgage/Finture case

This chapter selects a specific Business Process Reengineering approach to structure analysis and design of Finture's support for the intermediary's primary process. After discussing specifics of the mortgage/Finture case, different approaches and toolsets are discussed briefly. This chapter concludes by selecting a specific approach and discussing the implications of the selected approach for this project.

4.1. Mortgage intermediary primary process

As several authors state, administrative processes (not just in the financial sector) are rather static [REI03], [BRO01]. Processes within different mortgage intermediary organizations are very similar, since the overall process flow is dictated by legislation and self-regulation initiatives (Wet Financiële Dienstverlening (WFD) and several general codes of conduct) [GEE03]. The differences between the operations of intermediaries mainly lie in the assignment of tasks to organizational roles, rather than the definition of tasks and their sequences. The intermediary's process can be seen as a de-facto standard, imposed by the market. Significant changes in the overall flow of the process, either within the intermediary or within the overall mortgage chain, are not very likely. Innovations can better be sought in the way the processes are supported. Realizing a better support for business processes might add value to the intermediary organization, by either reducing the operational costs or increasing the service level delivered to customers.

The main research question shows that the result aimed for, is the Business Process Support activity. The outcomes should describe changes or extensions to the Finture platform, realising a better support for the mortgage provider's process and thereby enhancing the market-position of the intermediary. As Figure 12 shows, BP Support is a Design and Reconstruct activity. In order to be able to redesign and implement (reconstruct) the new support solution, the Diagnose stage has to be completed first. As shown in Figure 12 and its preceding section, this phase consists of understanding, modelling and analysis of the existing situation. When the current situation is clear, deficiencies can be identified and value-contributing adjustments can be proposed and designed. This will lead to an improved business process support infrastructure, defining how Finture can extend its support for the mortgage intermediary.

4.2. Different BPR approaches/toolsets

The first step is to select an overall approach or methodology for analysis and redesign of business processes, in order to define a new or adjusted business process support infrastructure.

Janssen et al conducted a study on existing BPR languages and tools [JAN99]. Tools they analyzed and evaluated were, among others: Protos, Business Process Designer, ExSpect, Arena, ServiceModel, SimProcess, ARIS, Grade and FlowMark. Their main findings are that the focus of the selected tools differed. Simulation tools focus on simulation and animation, Extended modelling tools focus on modelling the current and future situation whereas the Integrated approaches, like ARIS and Grade, focus on modelling and the combination/integration of different models in a single tool [JAN99].

The ARIS approach is a well-known approach to enterprise modelling. The ARIS toolset has become a market-leading solution in business process engineering. ARIS's main benefits lie on the field of modelling the different aspects (domains) of organizations with the ultimate focus on system design [SCH99]. This system-focus can be recognized in the intensive use of ARIS in SAP (R/3) implementation projects [SCHE99].

The most important observation of Janssen et al is that there is no tool that completely supports the BPR-trajectory [JAN99]. There is only minor support for analysis and support for redesign is completely missing. These observations led to the development of a new integrated BPR approach by the Telematics Institute, resulting in the BiZZdesign methodology. This BiZZdesign approach is developed in cooperation with several actors in the Dutch financial sector. BiZZdesign (or its predecessor Testbed) is focussed at (IT-enabled) reengineering projects in information intensive processes [FRA00].

4.3. Conclusion on selected approach

The application of business process analysis in system design and implementation projects is very relevant in the mortgage/Finture case. This project has this 'system design' objective. However, ARIS is not unique in this ultimate goal strived for. Venkatraman declared IT as the single most important lever in reengineering projects [VEN94] and most of the contemporary Business Process Reengineering approaches and integrated toolsets recognise the important role IS/IT plays in any modern business. Also the BiZZdesign approach has this ultimate aim. The overall BiZZdesign approach provides support for the analysis, design and management of architectures, processes, organizations and systems [BER03].

The mortgage intermediary's process addresses two of the main characteristics of the BiZZdesign approach. This process is an information intensive process in the Dutch financial market. Together with support for the overall BPR-trajectory and the availability of the

BiZZdesign tools on the University Twente, these are strong arguments in favour for this approach. This is the approach adopted for the remainder of this thesis. Since the BiZZdesign approach is intended for IT-enabled process (re)design, it suits the proposition and evaluation of alternative business process support alternatives. This answers the first research question as discussed in section 2.3.4, identification of an approach for analyzing the mortgage/Finture case.

The BiZZdesign methodology consists of 4 distinct approaches: the innovation approach, the analysis approach, the redesign approach and the migration approach [BER03]. The latter three can be considered equal to the Diagnose, Redesign and Reconstruct stages of the Stage-Level framework. This conforms to the situation depicted by Figure 8, answering the research questions positioned in the Stage-Level framework involves the Diagnosis and Redesign stages. Thus, in order to be able to define an improved Business Process Support infrastructure, the analysis and redesign approaches of BiZZdesign should be completed.

4.4. BiZZdesign Analysis & Redesign approaches

The previous section identified the BiZZdesign methodology, and especially the analysis and redesign approaches, to be very appropriate for analyzing the mortgage chain in investigating whether and how the intermediary's business process can be better supported by Finture. This section describes the BiZZdesign approach for this purpose. Based on this approach the mortgage case will be analyzed, this is discussed in the next 5 chapters.

4.4.1. Analysis approach

The analysis approach consists of 5 distinct subsequent steps [BER03]:

1. scoping
2. determining means
3. modelling
4. analysis
5. evaluation

The purpose of this approach is to get an understanding of the current situation, the overall mortgage chain, the role of the intermediary in this chain, the intermediary's internal primary process and the support by means of IT (both Finture and other solutions). With this understanding, opportunities can be identified. These opportunities will be the point of departure for the redesign approach.

4.4.2. Position in research model

The BiZZdesign analysis approach will realize the first three research goals. By presenting the overall mortgage chain, a general understanding of this industry is created. Subsequently, depicting the current role of Finture enables comparison leading to the identification of opportunities to (better) support information flows and activities in the intermediary's process

and context. The second and third research question of this project will be answered after application of this approach.

4.4.3. Redesign approach

The opportunities resulting from the analysis approach form the input in the redesign approach. This approach consists of 4 distinct subsequent steps:

- determining range
- determining essentials
- design
- define criteria, compare and choose

The purpose of this approach is to further analyse the opportunities found in the previous step and subsequently propose design alternatives for it. The selection of one of these alternatives forms the input of the succeeding migration approach, which will be left out of scope of this thesis.

4.4.4. Position in research model

The BiZZdesign redesign approach is focused on the fourth and fifth research goals, resulting in recommendations on how to implement solutions for the opportunities to better support the intermediary's process. This answers the fourth and fifth research question.

This chapter presented the evaluation of various BPR approaches in the light of application on the Finture case. This evaluation identified the BiZZdesign approach as the most suitable approach for this very case. The following three chapters present the BiZZdesign analysis approach. Chapter 5 elaborates on the overall mortgage process and Finture's current role in it. Based on this analysis two unsupported processes are identified. Chapter 6 and 7 analyse these processes in more detail and form the basis for the redesign approach. This approach is presented in chapters 8 and 9, resulting in the recommendation of design alternatives for the unsupported processes.

5. Analysis approach

This chapter presents the results of the analysis approach of the BiZZdesign methodology, providing a general understanding of the mortgage chain as a whole and the (support for the) intermediary's primary process. This section answers the second and third research question. The structure of this chapter follows the steps in the BiZZdesign approach. After first defining the scope of the analysis and identification of means to be used, the actual analysis is conducted. This chapter identifies the currently unsupported sub-processes the mortgage process and concludes with the selection of a set of these sub-processes that could be (better) supported by Finture.

5.1. Scoping

The main purpose of this research, as introduced in the research outline is to get a clear understanding of the mortgage chain, the intermediary's primary process and Finture's role in supporting this process. By analyzing these aspects, deficiencies and opportunities can be identified.

5.1.1. Project goal

The project is initiated by Topicus, in order to ultimately offer a better product to their customers. The primary goal of this project is to increase the value-add of Finture for its users. Using Finture, the intermediaries can offer a higher service level to their customers and prospects. So the goals of both Topicus and the intermediary can be defined as *improving the offered service level* in terms of BiZZdesign. Since the main problem owner is Topicus, improving the service offered by Finture to the intermediary is the main project goal.

5.1.2. Norms & Critical Success factors

The norms and Critical Success Factors (CSFs) for Finture are listed below. These CSFs and norms will be used to assess the existing and to-be processes (design alternatives) on. The norms and CSFs are derived from Finture's functional strategy (See section 1.2 for Finture background).

Norms and CSFs:

- 1) Finture should support the whole of activities and information flows within the primary process of the mortgage intermediary
- 2) Service level should be high
 - a. Throughput time should be minimal
 - b. Quality of advice should be maximal

Since the situations of the customers differ, and the products and their conditions they apply for differ, these quantitative norms cannot be explicitly valued properly.

5.1.3. Object of analysis

The following table (Table 1) defines the object of analysis for the three main perspectives of the BiZZdesign analysis approach: processes, actors and items.

Perspective	Description object(s)
Processes	Prospect-phase primary process intermediary. This prospect-phase includes every step between the acquisition of the intermediary and the final mortgage transfer
Actors	<ul style="list-style-type: none"> o Customer o Intermediary organization o Mortgage provider/authorized agent o Purchaser’s organization o Notary o Land registry o Appraiser o BKR (credit registration office) o NHG (foundation providing insurance for homeowners)
Items	Information on: <ul style="list-style-type: none"> o Customer (personal details, income, assets, financial obligations, plans, desires) o Real-estate (value, type, maintenance status, renovation costs) o Requested mortgage (value, interest term, interest structure and %, risk coverage) o Tax & social systems o Product details mortgage products (interest, conditions) o Norms (codes of conduct, provider norms, product norms)

Table 1 – Definition object of analysis

5.2. Determining means

In order to be able to analyse the current situation, concrete means must be defined. For selecting these means, the Stage-Level diagrams of Figure 12 to Figure 14 are combined and mapped on each other. As far as Figure 13 is concerned, only the second and third research questions (sub-questions 2.x and 3.x in Figure 13) are dealt with in this section. The other sub-questions refer to the in-depth analysis and redesign phase of this project which are discussed in chapters 8 and 9 of this thesis.

This mapping of the Stage-Level diagrams results in the following set of activities and modelling techniques to be used in answering the research questions. Not all the research questions can be mapped on (a) modelling technique(s), these questions will be answered by other means. Table 2 presents the research questions that can be answered by means of modelling techniques.

Research Question	BPR Activity	Modelling technique
2.1	BP Analysis, BP Modelling, BP Architecting	Value chain/network, Process Flow diagrams & Actor/Context diagram
2.2, 2.3	BP Analysis, BP Modelling	Actor/Context diagram
2.4, 3.1	BP Support	Architecture diagram

Table 2 - Mapping research questions - modelling techniques

Table 3 presents the primary means in answering the other research questions.

Research Question	BPR Activity	Means
3.2, 3.3	BP Support	Interviews Topicus-consultants, study industry, analysis Finture documentation

Table 3 - Mapping research questions - other means

Research questions 1 is answered in chapter 4 resulting in the selection of BiZZdesign as overall approach. Research question 4 is answered in chapters 8 and 9, using the same means as research question 2 (actor/context diagram, Process Flow diagram & architecture diagram). The next sections discuss the listed modelling techniques in little more detail.

5.2.1. Value chain modelling

A widely accepted methodology of high-level analysis of external business processes is the value chain of Porter [WAR02]. Modelling the value chain provides insight in the process on a very abstract level. The concept of the value chain, as introduced by Porter [WAR02], departs from the notion that:

"Every firm is a collection of activities that are performed to design, produce, market, deliver, and support its products or services. All these activities can be represented using a value chain. Value chains can only be understood in the context of a business unit."

Every value chain is only one part of a larger set of value-adding activities in an industry. Porter defined this larger 'system' of value chains as *industry value chain* or *value system* [WAR02]. This value system approach is an interesting approach in analyzing the mortgage chain on an abstract level.

Ward and Peppard evaluate Porter's *Value Chain* framework in e-commerce perspective and conclude that:

"For an organization to identify the overall implications of e-commerce, [...], the information flowing through the industry – the external value chain – should be analyzed before the information processes can be optimized inside the business."

This *external value chain* of Ward and Peppard can be interpreted as the *value system* of Porter. In the Ward and Peppard definition, it emphasizes on the key role information plays throughout the chain, whereas Porter's value system focuses on tangible goods [WAR02].

Another contemporary approach to modelling value chains is the e³-value method of Gordijn [GOR02]. This method provides means to model value exchanges between in actors in e-commerce market situations. Central aspect in this method is the economical value-flow between actors. The e³-value method is mainly aimed at modelling the economical aspects of actor interactions in order to provide an understanding of the cooperation between the actors involved [GOR02]. For the analysis of the mortgage in order to identify deficient or unsupported (sub) processes and information flows, this value is of less relevance. The value added by the information flows is assumed, otherwise the interactions would not exist. The analysis in this research is focussed on (the content of) the information flow itself, rather than the value it represents. Therefore the e³-value method is not relevant in the context of this project.

The intangible characteristic of information flows throughout the chain, as discussed by Ward and Peppard, is a main characteristic of the financial service industry. Therefore, their *external value chain* concept is adopted for analyzing the mortgage chain. This abstract external value chain can enable further analysis, by "zooming in" on the model, decomposing identified actors or activities [WAR02].

5.2.2. Actor & Context analysis methodology

Wieringa introduces the following entities, possibly occurring in the environment of a system [WIE03]:

- Physical entities (devices, natural objects and people)
- Conceptual entities (organizations, promises, vacation rights)
- Lexical entities (contracts and specifications)

In their article on Context Modelling, Gross and Klemke [GRO02] present the results of a literature study on important organizational context dimensions.

They recognize the following possible dimensions:

- Organizational (workflow, structure, enterprise ontology)
- Domain content-based (domain ontology, knowledge)
- Personal (knowledge profiles, user profiles, interest profiles)
- Physical (location, time)

Not all dimensions in terms of Gross and Klemke can be seen as distinct entities, for instance workflow, organizational structures, ontology or (tacit) knowledge. These aspects are more like compositions or constitutions of entities. Combining the 'tangible' entity concept of Wieringa with the more 'intangible' dimensions concept of Gross and Klemke, is best beneficial in describing the whole context with respect to business activities and actor-interactions.

Warren proposes a guideline for context analysis from the business viewpoint.

1. collect all possible documentation on the system
2. identify all classes of system users
3. interview users on how they use the system in order to fulfil their tasks

Before identifying classes of system users, it is necessary to identify entities occurring in the environment. This will result in a context diagram in terms of Wieringa. This helicopter-view enables identification of the user-groups, by zooming in on the organizational or personal entities found.

Analyzing the user-groups results in a set of use cases representing the way users use the system in completing their tasks. Based on these use cases a work-flow diagram in the form of an UML activity diagram can be composed. This provides an insight of the business activities the system supports, or at least the activities the users actually use the system for.

The context can be modelled by Context diagrams or Actor diagrams in terms of BiZZdesign. These diagrams are very similar, indicating the interactions between several actors operating within the direct environment of the system under development. Since BiZZdesign is the overall BPR approach adopted in this thesis, the latter diagram technique will be used to model these interactions.

5.2.3. Process flow diagrams

In modelling the flow of the processes involved, the BiZZdesign tool will be used. This tool contains a developed version of the AMBER modelling tool. This tool provides a broad range of constructs to depict a business processes in its full complexity.

5.2.4. Modelling Business Process Support (Architecture modelling)

Warren writes in his book entitled "The renaissance of legacy systems" about identification of support for processes by existing systems [WAR99]. Although this book is on legacy systems, his analysis methodology is appropriate for analysis of any existing system. Warren states that in order to understand the usage and functionality of an existing system, a contextual and a technical model are the key components in analyzing the current situation [WAR99]. The contextual model he introduces describes 'what' a system does, whereas the technical model elaborates on 'how' a system implements its behaviour [WAR99]. In identifying supported processes, this 'what'-aspect is the main question, thus contextual modelling in terms of Warren is most appropriate. Contextual Modelling, or Context Analysis, according to Warren is representing the environment of a system by means of diagrams, in order to get an understanding of the system itself required in any system evolution project [WAR99].

The main objectives of context modelling, according to Warren are to:

1. develop high-level documentation
2. provide an overview of supported business activities
3. support evolution strategy selection

Especially this second objective is interesting in this specific case, in identifying the currently supported activities. Warren defines four viewpoints a system should be studied from in a context analysis, in order to meet the objectives. These viewpoints are:

- o Functional
- o Structural
- o Business
- o Environment

Insight in Business activity support of legacy systems (one of the goals of context analysis) is derived by studying the business and functional viewpoints [WAR99]. However, the functional viewpoint is used to produce a technical insight on how the business activities are supported. This is too technical oriented for the Finture analysis and therefore, this viewpoint will be omitted.

The representation of which activities are supported by which system can be done by an architecture model like the ArchiMate methodology offers [LAN05]. An ArchiMate model offers insight which systems realize which business function or business service. Composing an ArchiMate model of the architecture of an intermediary currently using Finture, offers a clear insight in how the several (sub-)processes are supported. This answers the fifth sub question for this research, providing means to understand and represent the current situation of Finture.

5.3. Modelling

This section presents the results of the different means as introduced in the previous section. These models provide an understanding of the value chain, the intermediary’s primary process and the support for this primary process currently offered by Finture. Based on these models, the processes that can be (better) supported by Finture are identified.

5.3.1. External value chain

The first step in the mortgage chain analysis is the external value chain. This value chain will be input for further decomposition in the next paragraphs.

Combining the concept of the *External Value Chain* [WAR03] with documentation on the overall mortgage-process from Van der Geest [GEE03], the value chain for the mortgage chain as a whole is derived. Figure 15 depicts the external value chain.

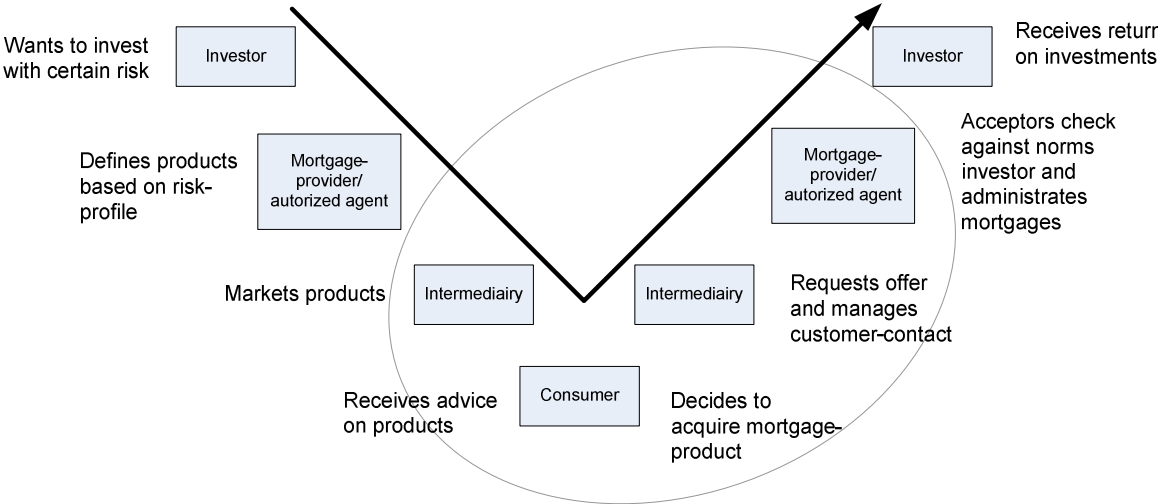


Figure 15 - External Value Chain mortgage chain

An investor wants to receive returns on his capital. Therefore the investor makes arrangements with mortgage-providers to invest by providing capital for mortgages. The mortgage-provider defines one or more products, based on the risk-profile concerted with the investor. These products are being marketed by intermediaries, which can be part of the mortgage-provider’s organization. A customer gets in contact with an intermediary and advances throughout the acquisition process.

This acquisition process consists of several activities. Eventually, the customer will request offers for one or more mortgage products. These requests will be evaluated by the

intermediary and/or the mortgage-supplier. In case of a positive result, the mortgage will be provided. After closing the mortgage deal, the real estate object transfer will take place and the mortgage administration by the mortgage provider starts. During the term of the mortgage, the initial investor receives return on his investment, while taking the risk of not receiving the total amount of his investment.

As defined in the scope definition of this thesis, the research is bounded to the prospect-phase of the mortgage chain. This phase starts when the intermediary commences marketing the products in its portfolio and ends when the mortgage is provided and fully administered. In Figure 15 this scope is represented with the ellipse. Only the processes of the captured actors will be taken into account in the remainder of this analysis.

5.3.2. Actors and their interactions

The mortgage chain actor diagram is represented by Figure 16. This diagram shows the abstract relations between actors. This answers the second and third sub-question of this research, representing the various actors, their interactions in the information the actors exchange.

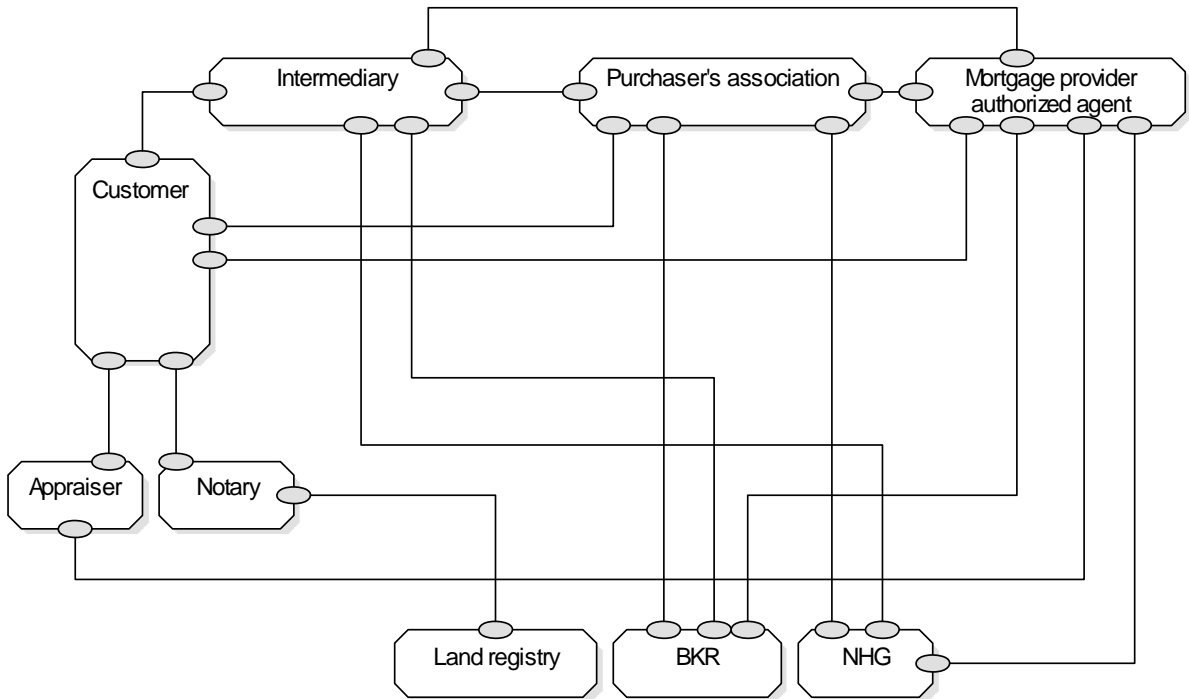


Figure 16 - Actor diagram mortgage process

Appendix A shows a more detailed diagram, containing all individual information flows between the actors. These information flows describe the items in terms of BiZZdesign to be exchanged by the several actors in the chain.

5.3.3. Mortgage chain process

With the external value chain, or value system in terms of Porter, the mortgage chain from *conception* to *disposal* is depicted. The first step in the further decomposition is the transformation of the high level value chain in Figure 15 into the different phases of the mortgage process. This specifies the different stages a customer encounters during his *journey* in the mortgage chain.

Figure 17 depicts the different phases of this overall process. The process starts with the acquisition activities of the intermediaries. Intermediaries want to interest customers for their products. When a customer is interested, his needs, wishes and goals are collected and an individual risk-profile is composed.

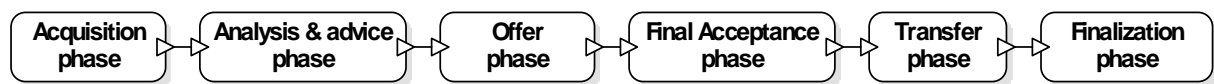


Figure 17 – Phasing overall mortgage process

Based on this profile, the intermediary composes an advice for specific products. When the customer is interested in one of the advised products, the intermediary requests one or more offers for the products at the mortgage-provider (or its authorized agent). This request can be rejected when either the request itself does not meet the requirements, or the situation of the customer does not meet the norms for the product involved.

When the request and the customer's situation did meet all requests, the offer is sent out to the customer. In case the customer accepts the offer, and wants to acquire the mortgage, the mortgage-provider (or its authorized agent) checks several exhibits (e.g. employer's certificate) and creditworthiness. When all these checks pass, the mortgage can be provided. Otherwise, the customer will be informed of the negative result of the acceptance-check, with its consequences like a penalty for the customer.

When the mortgage can be provided, the notary fulfils the transfer step. The deed of transfer and mortgage-deed are framed, and the final transfer takes place.

After the transfer, the mortgage-provider finalizes the provision by administering the mortgage in its back-office systems. With this step, the prospect phase of the mortgage process finishes. The customer transformed from prospect to customer.

The following section decomposes the overall process, showing the sub-processes and actor interactions taking place.

5.3.4. Decomposed mortgage chain process

The following diagrams provide the decomposed models of the different sub-processes as depicted in Figure 17. In each of the diagrams the various activities taking place, as well as the actors involved are depicted.

Acquisition phase

The main purpose of the acquisition phase is to generate leads for the intermediary. Based on a long-list of prospects, the consumers interested in mortgage products are marked as hot-lead.

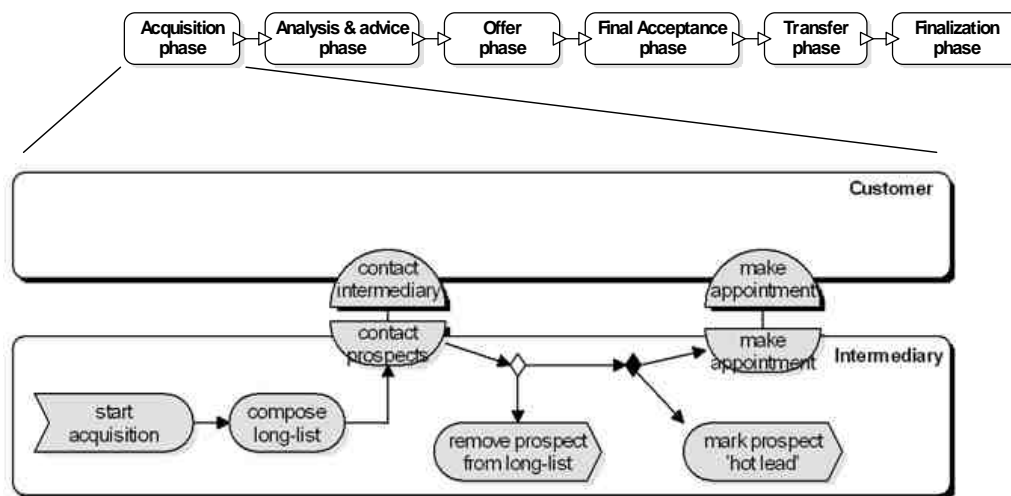


Figure 18 - Sub-process Acquisition phase

The intermediary will try to make an appointment with the hot-leads in order to provide them with advice on one or more products in their portfolio.

Analysis & Advice phase

In the analysis & advice phase the specific wishes and needs of a customer are identified and a mortgage configuration and specific products are advised.

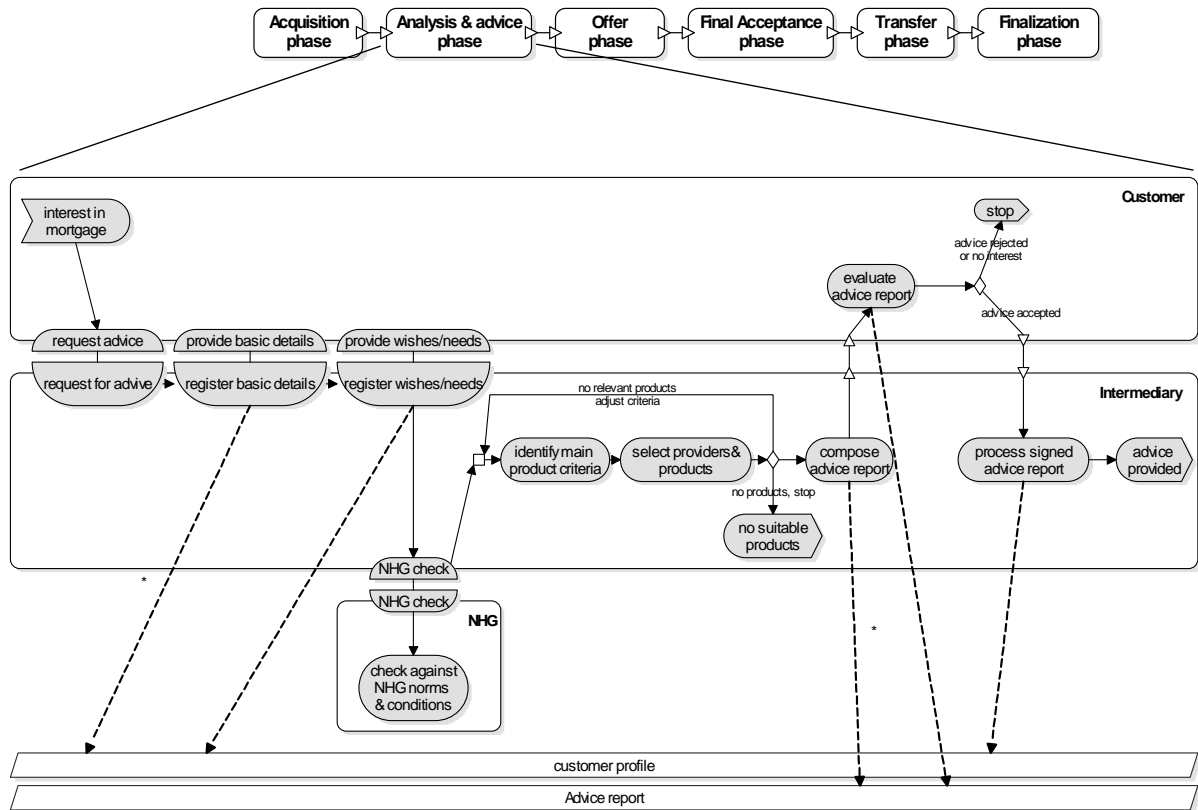


Figure 19 - Sub-process Analysis & Advice phase

This phase either results in the termination of the mediation trajectory or in providing an advice report on selected products. Based on this advice report, the intermediary can request offers at the mortgage providers.

Offer phase

In the offer phase, offers for mortgage products are requested and evaluated. The offer requests are assessed on several criteria and on a positive result of the various checks, offers are provided.

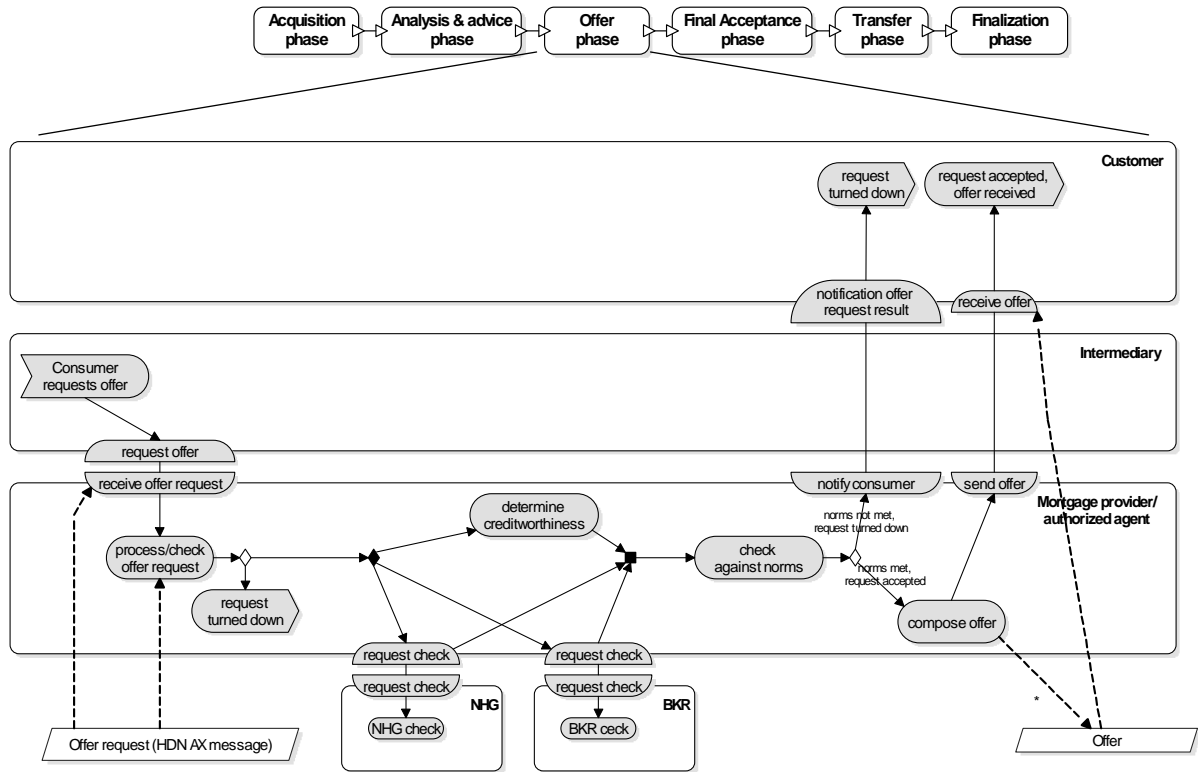


Figure 20 - Sub-process Offer phase

This phase either results in a rejection of the offer request, when the customer does not meet the product criteria, or with an offer for the specific product(s).

Final Acceptance phase

The final acceptance phase starts when a customer accepts an offer and applies for the product(s). In this phase, the mortgage provider determines whether the details provided in the offer request are correct and can be validated. Therefore (physical) exhibits are tested. On a positive result, the mortgage can be provided.

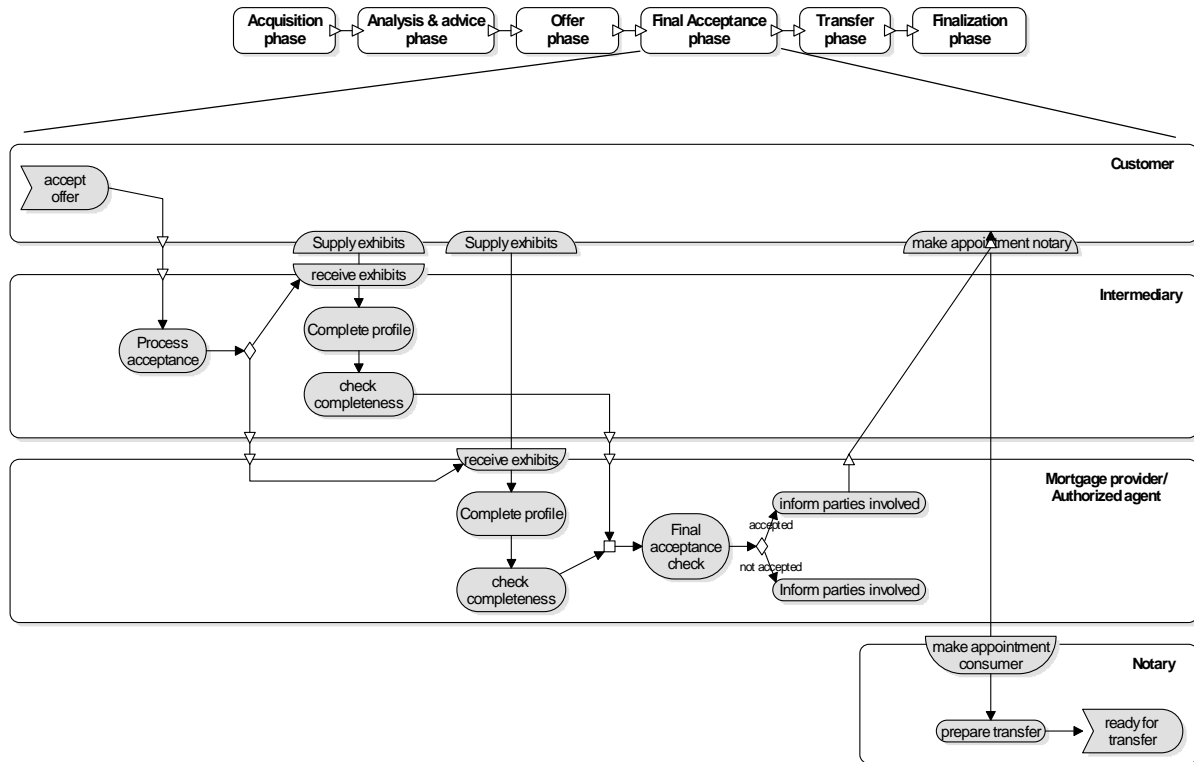


Figure 21 - Sub-process Final acceptance phase

This phase results in the provision of mortgage, or the rejection of the requested product. This latter situation is the case when the customer cannot justify the information specified in the offer request (see Offer phase, Figure 20).

Transfer phase

In the transfer phase, the actual transfer of the mortgage value takes place. By signing the mortgage deed the customer and mortgage provider confirm their deal and the value is exchanged.

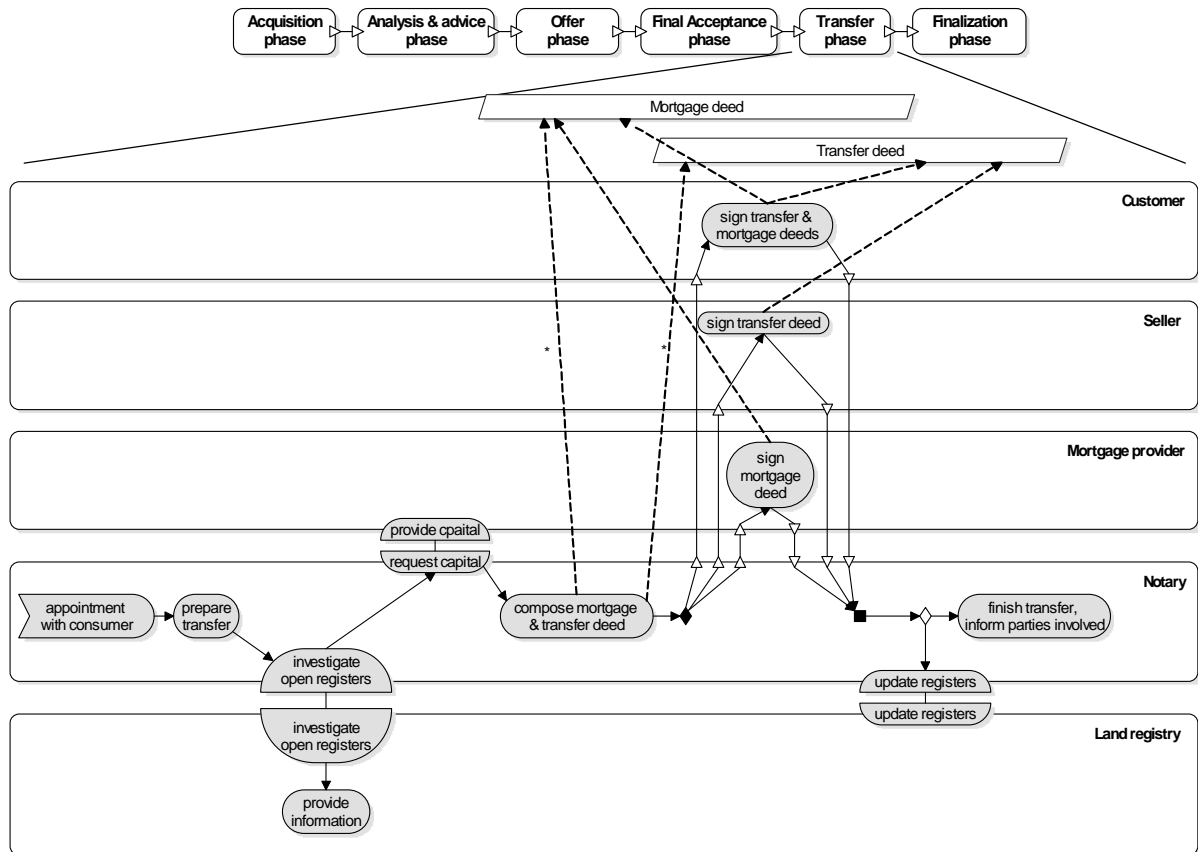


Figure 22 - Sub-process Transfer phase

After this phase, the mortgage is provided and the customer can invest this money in the acquisition or maintenance of the real-estate object involved.

Finalization phase

In this last phase, the mortgage provider administers the provided mortgage and starts the 'daily maintenance' of the mortgage.

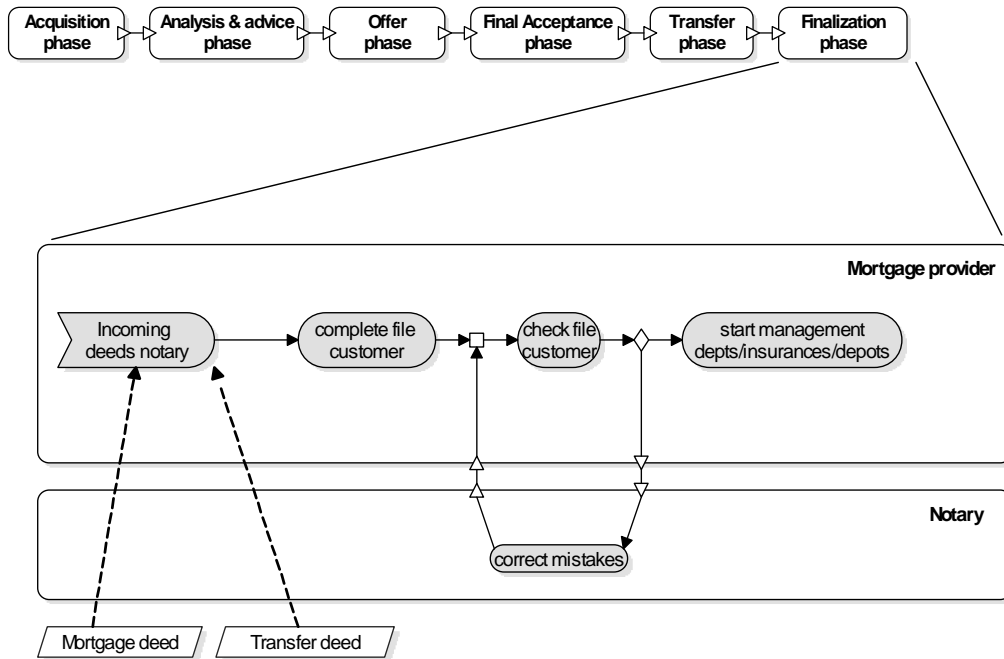


Figure 23 - Sub-process Finalization phase

5.3.5. Intermediary primary process

Figure 24 presents this constitution of the intermediary's role in the decomposed diagrams discussed above. This diagram uses the ArchiMate notation. This process focuses on the processing of a single customer's proposition.

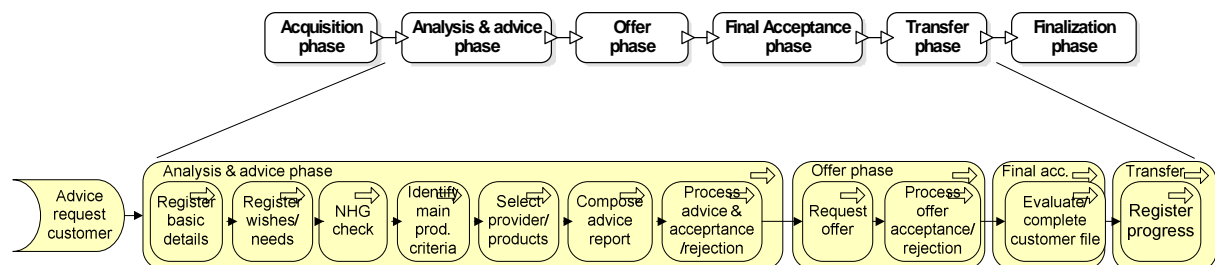


Figure 24 - Intermediary primary process, 'prospect-phase'

The acquisition activities fall outside the prospect-phase of this process, since the prospect-phase, according to section 2.2, starts after the customer has shown interest in advice on mortgage products.

The primary process of the intermediary is quite straightforward and not very complex in itself. The complexity in the mortgage chain is within the diversity and (technical) complexity of mortgage products and the norms the providers enforce on the customers applying for certain products. The process flow as such is rather linearly. A customer-proposition flows through the process. In every phase the trajectory can be stopped.

5.3.6. Intermediary’s supporting processes

Besides the primary process, the intermediary organization has several supporting processes. Without describing them in detail, the most important supporting processes are [KRA05b]:

- Product portfolio management
- Financial transaction management mortgage provider/purchaser’s association
- Process (performance) management

5.3.7. Identification of Finture’s support for primary process

Applying the context analysis methodology as discussed in section 5.2.2 of this thesis, the first step is identification of entities and user groups involved. Based on studying documentation and interviewing Topicus consultant, the following entities are recognized within the Finture environment:

Entity	Description
Intermediary	The organization selling mortgages to customers using Finture.
Purchaser’s association	Conglomerate of intermediaries, possibly taking over a part of the activities of the mortgage-provider.
Mortgage-provider	Company offering mortgage products to customers, via the intermediary sales-channel
Appraiser	Appraises real-estates in order to determine value
BKR (Credit registration Office)	Authority responsible for providing information on customer’s debts
NHG (National Mortgage Insurance)	Web service to check whether a customer qualifies for a NHG-insurance.
Cendris	Provider of Postal-code information

Table 4 - Organizational Entities in Finture environment

Figure 25 represents the current Finture environment by means of an Actor-diagram.

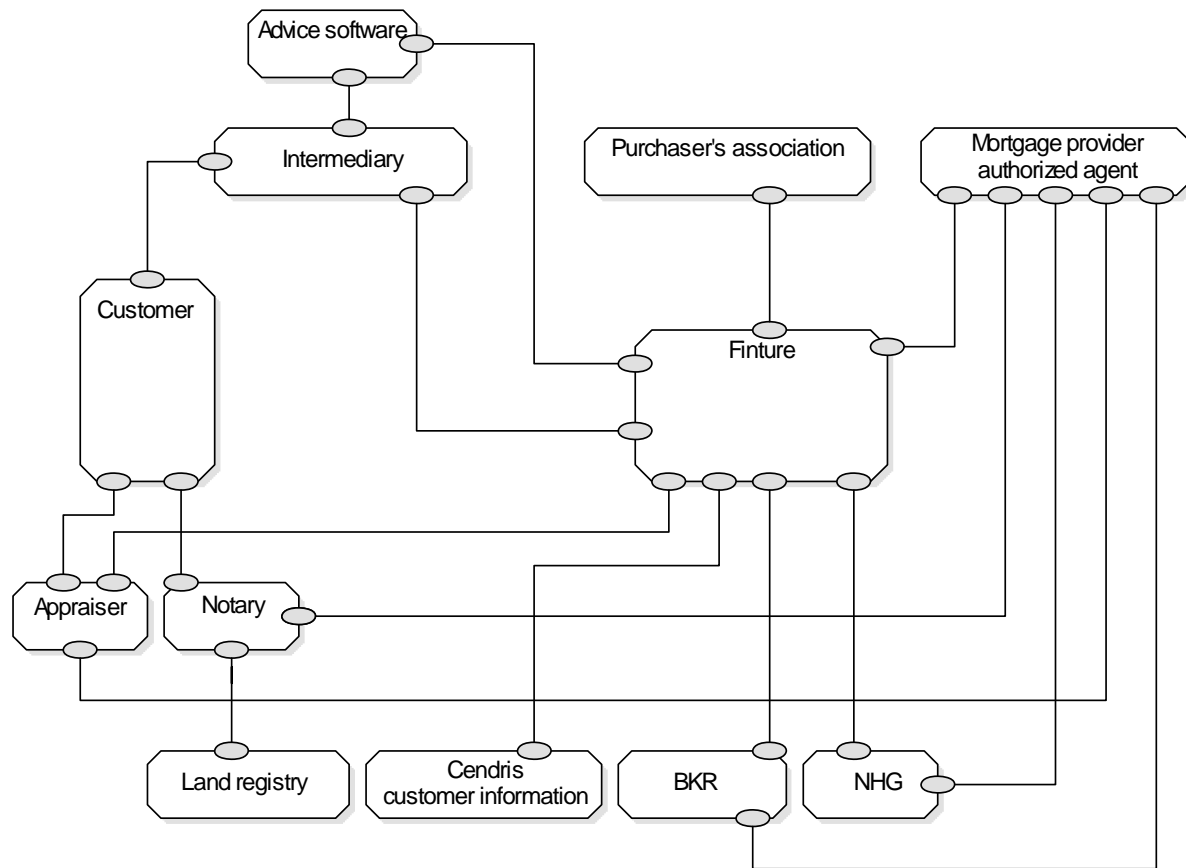


Figure 25 - Actor diagram Finture As-is

A detailed version of this diagram can be found in Appendix B, specifying the concrete information flows and interactions between the actors.

After identifying the entities in the Finture environment, the next step is identifying the user groups involved.

The Finture platform offers several “cockpits”. These cockpits can be seen as organizational-entity specific user interfaces. Each of the cockpits consists of several *roles*. A role defines which information can be accessed and which activities can be performed. The individual roles can be seen as a set of activities, similar to functions (job descriptions). However, in smaller organizations individuals will have several roles. In Finture, these roles consist of a set of available system-functionality, enabling the end-user to complete a specific task (business activity) in the overall process.

By departing from the role perspective, identifying all roles and subsequently “zooming in” on every role will ultimately result in all the system’s functionality. This enables identification of supported tasks and thereby the supported business activities. Not all the roles within the

several cockpits map to the primary process of selling mortgages. Many roles are *supporting roles*, used in maintaining and configuring the Finture platform (i.e. *Maintenance* in the Intermediary cockpit), or managing the operations of the involved organizations (i.e. Operational management in Intermediary cockpit).

All of the roles can be classified in one of the following three groups [KRA05b]:

- Monitoring and management
- Primary process
- Facilitating

By analyzing the Finture documentation [KRA05a], [KRA05b] it is reasonably to state that only the *intermediary cockpit* contains functionality that is classified as “primary process”. The specific roles within this cockpit will be looked at in more detail in the next sections.

Intermediary cockpit

The intermediary cockpit is the main cockpit, since the intermediary is the number one intended user-organization of the platform. The roles defined within this cockpit are listed in Table 5.

Role	Description
Acceptance	Overview of (offer) acceptance result, received from mortgage providers
Agenda management	Plan/request sessions (e.g. meetings/phone) with customers, invite co-workers
Back office	Overview of customers, the products they acquired and their conditions
Financial administration	Administration of monetary flows between chain-partners
Front office	Prospect-details management, proposition management, advice management, contact-history management
Complaints handling	Management of customer complaints
Lead management	Campaign management, lead details management
Maintenance	Management of Finture meta-information, permissions and settings
Operational management	Insight in operational performance, throughput, capacity ratio, workload
Sales	Management of current sales
Strategic management	Insight in strategic, overall information on performance and ratios

Table 5 - Roles Intermediary cockpit

With respect to the scope of this research, only the roles associated with the primary process are interesting. These roles are:

- Acceptance
- Agenda management
- Back office
- Front office
- Lead management
- Sales

With these roles, the specific supported business activities in the primary process can be identified.

The roles included in this listing are the roles directly associated with the primary process of the intermediary. The following lists will briefly define the functionality within each of the roles associated with the primary process. As stated before, Finture contains a lot more functionality, focussed on supporting and managing the operators of the platform.

Role: Acceptance

The acceptance role provides functionality to:

- view status and results of offer acceptance check by mortgage provider
- view status and results of final acceptance check by mortgage provider

Role: Agenda management

The Agenda management role provides functionality to:

- request appointments between customers and intermediary employees
- mark customer appointments in the organization-wide agenda
- maintain appointment details (where, when, who, why)

Role: Back office

The Back office role provides functionality to:

- manage customer information details
- manage customer-product relations, facilitate after-sales support

Role: Front office

The Front office role provides functionality to:

- manage customer basic details (name, contact information, civil state etc.)
- manage work & income details (employer, salary, type of contract etc.)
- manage current living-details (active mortgages, current properties etc.)
- manage financial details (private capital, active debts, active credits)
- manage basic details on future (expected moment of retirement, expected changes in personal situation)
- manage basic preferences on mortgage (structure, type, costs, development)
- manage customer contacts
- register given advices (generated by external application)
- store provided mortgages (provider, product-name, product details)

Role: Lead management

The Lead management role provides functionality to:

- import (Excel) files with lead details
- identify hot leads, marking leads as hot-leads
- transferring leads to customers

Role: Sales

The Sales role provides functionality to:

- maintain customer details (basic, work & income, living, financial details)
- maintain customer contacts
- maintain products acquired by customer

Based on Warren's method for business activity support identification, as discussed in section 3.4 of this thesis, these lists of functionality can be used to derive the supported business activities. This derivation will be done using an ArchiMate diagram. Figure 29 represents the Archimate diagram of the architecture of the current intermediary situation. This depicts the relation between the actors in Finture's environment, the business services and activities they invoke and the technical systems realizing these services and activities.

5.4. Analysis

The previous section described and modelled the overall mortgage process, the intermediary's primary process and the current support for this primary process offered by Finture. This section will analyze the facts found in the models of section 5.3 and compare these with the norms and success factors specified in section 5.1.2.

5.4.1. Identification (un)supported information flows

Figure 26 represents the simplified context diagram of the mortgage chain. The detailed diagram can be found in Appendix A.

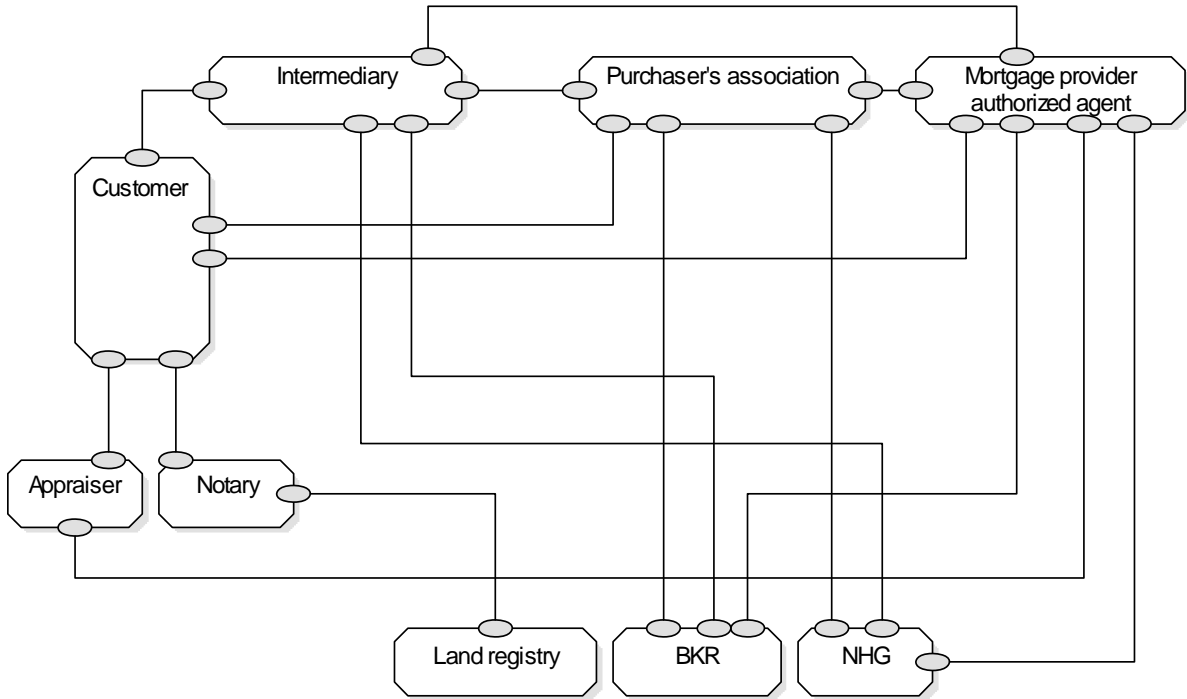


Figure 26 - Overall mortgage chain Actor diagram

Figure 27 depicts the simplified context of the mortgage chain including Finture as introduced in chapter 4. The detailed diagram can be found in Appendix B.

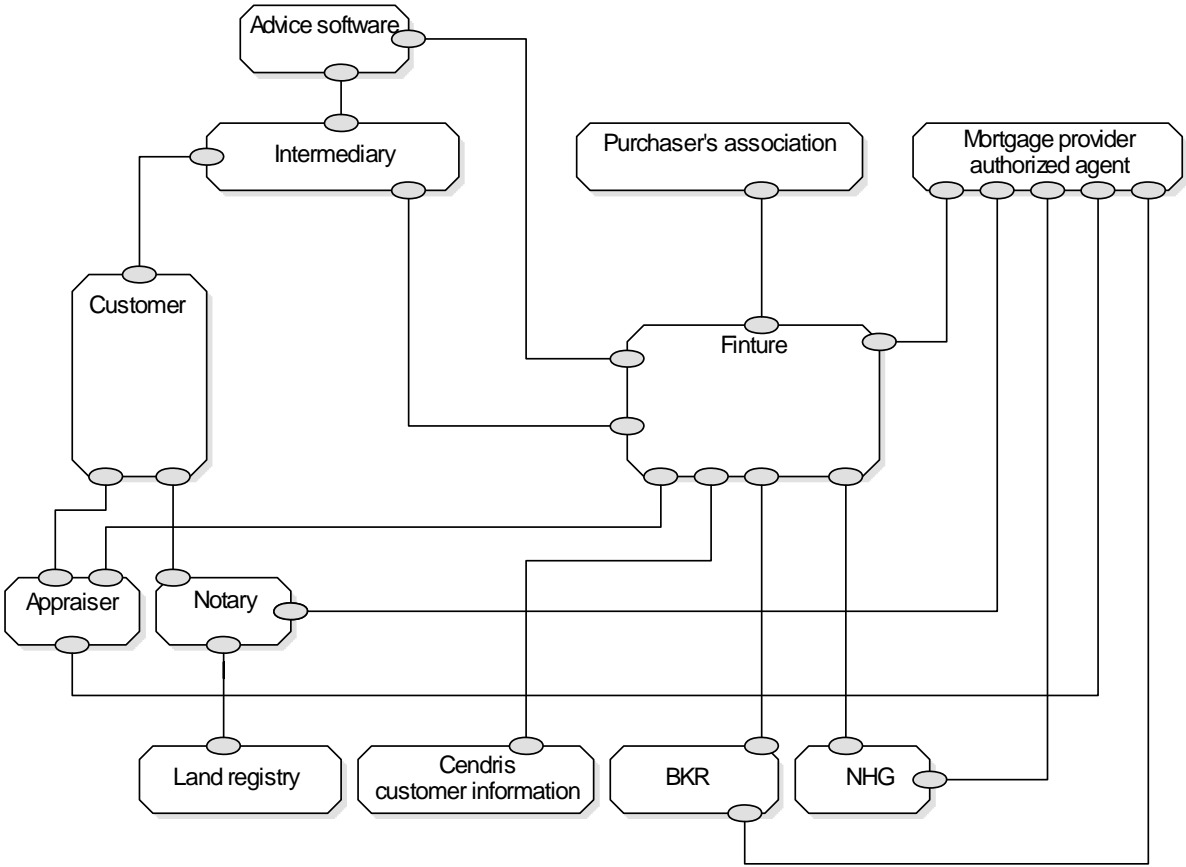


Figure 27 – Actor diagram Finture as-is

Removing Finture and all its interactions with other entities from this context diagram, results in Figure 28. This is the environment seen from Finture perspective, without the interactions it is involved in itself. A more detailed version of this diagram, including the information flows, can be found in Appendix B.

This diagram shows that all information flows between the intermediary and its chain partners are facilitated by Finture. There are no interactions between the intermediary and chain partners outside Finture that could be supported by Finture. It should be noted that physical information flows, like exchange of physical exhibits (i.e. signed documents) for the final acceptance check, are omitted in this diagram since they cannot be automated at the moment.

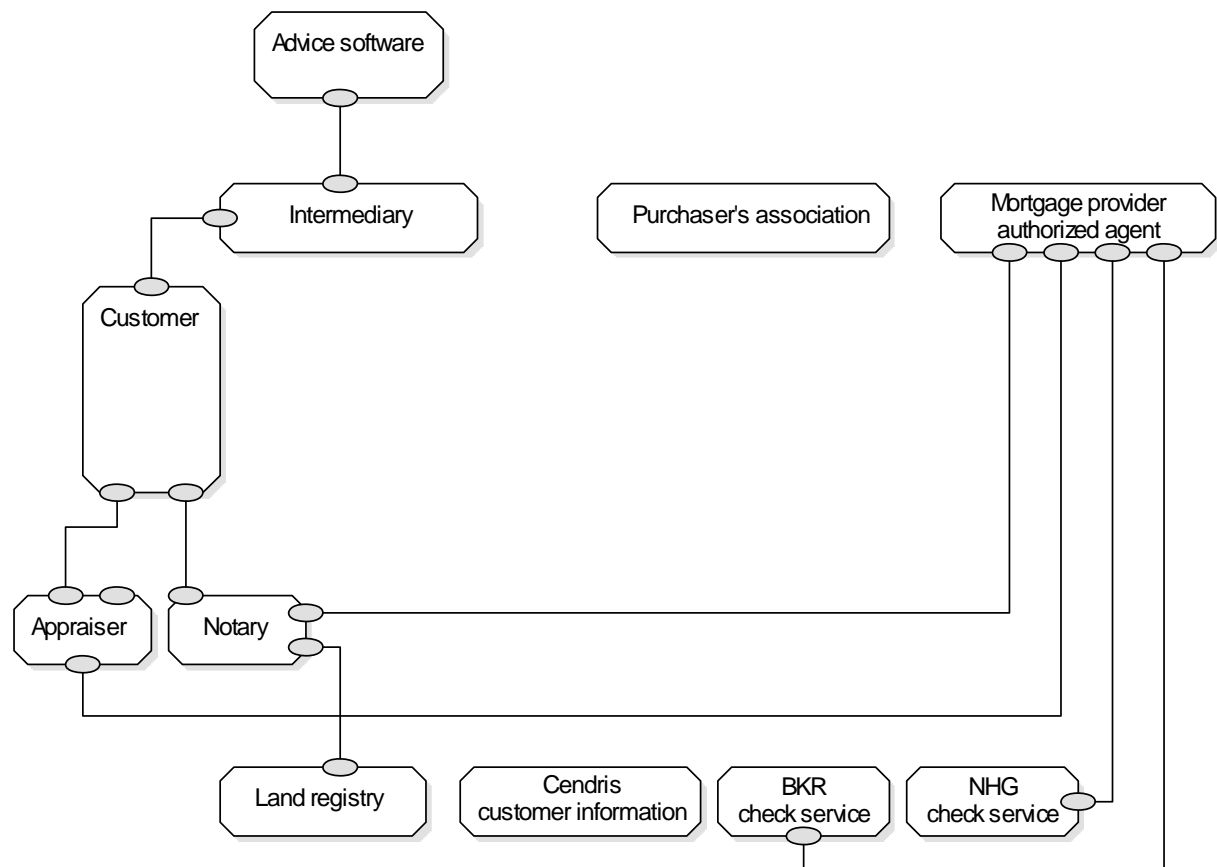


Figure 28 – Actor diagram mortgage process, without Finture

The only non-Finture interactions between the intermediary and its environment are customer-contacts and interaction with the advice-software. The customer contacts are very important for the intermediaries, since that is their major advantage, building relationships. The other interactions between chain-partners are beyond the Finture scope.

From the intermediary point of view, all relevant information flows in the primary process are supported by Finture. There is no value-add to be found in supporting additional information flows.

5.4.2. Identification (un)supported business activities

When looking at the ArchiMate diagram of Figure 29, Finture can be seen as a generic information and workflow management system. Finture registers the customer details and propagates a proposition through the process, without actually conducting the 'complex tasks' in the process. The main propose is to support the 'flow' of the business process by providing the employees with the propositions they should process.

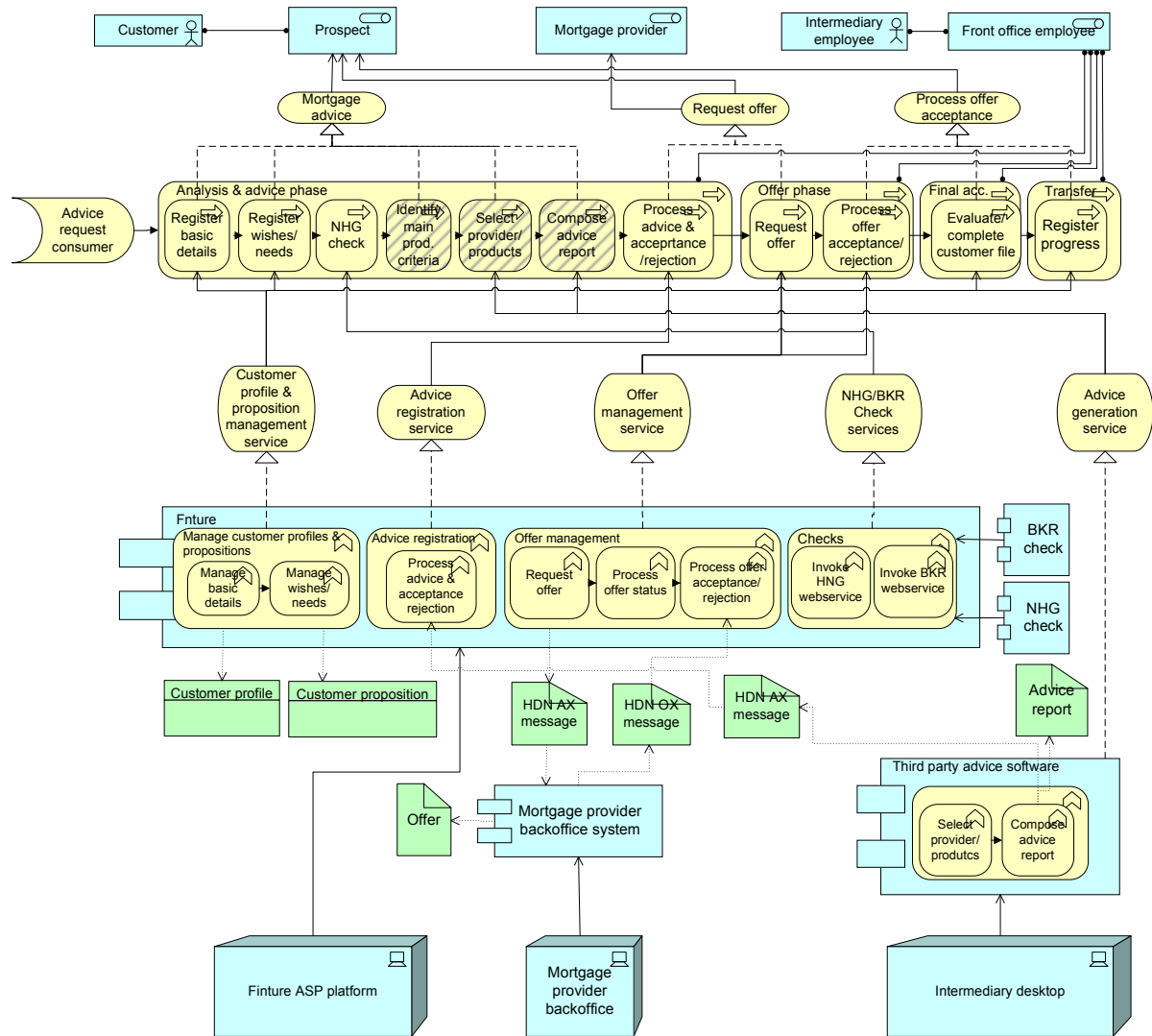


Figure 29 – ArchiMate diagram current situation Intermediary using Finture

The activities in the advice phase of the intermediary’s process (Figure 17) are partially supported (represented by hatched sub-processes in Figure 29). Finture supports the registration of a prospect’s personal details and its needs, wishes and desires. The identification of relevant product criteria, the selection of product alternatives and the lifetime-calculations required in composition of the advice report are not supported. Regarding the NHG and BKR checks, Finture provides application level interfaces, enabling the automated invocation. By these means, Finture supports these checks.

Finture's support continues with processing the advised products and the prospect's reaction to this (acceptance or rejection). This answers the second research question, identifying the currently unsupported activities and information flows.

5.5. Evaluation & Selection

Concerning the interactions between the intermediary and its chain partners, there is no value to be gained in supporting additional interactions in the chain. All relevant information flows are already facilitated by means of Finture.

Regarding unsupported activities in the intermediary's primary process, the following steps occur outside its direct control span (see Figure 29, hatched processes):

- Identification main product criteria
- Selection mortgage providers/products
- Compose advice report
- Actual NHG/BKR checks

When a request for an offer is sent to a mortgage provider, this offer is checked and evaluated (See section 5.3.4 for a detailed process flow diagram). Depending on the result of this evaluation, an offer is either proposed or the request is rejected. This Offer Acceptance Check, as well as the Final Acceptance Check in case a customer accepts an offer, falls outside the direct span of control of the intermediary. Furthermore, the transfer of the mortgage and real-estate property and the administrative activities regarding deeds are not facilitated by Finture. Although these processes are not within the span of control of the intermediary at the moment, supporting these processes might increase Finture's added value. This means the list of unsupported activities must be extended by the following activities (see process flow diagrams Figure 20 to Figure 22):

- Offer Acceptance Check
- Final Acceptance Check
- Transfer

The NHG and BKR checks themselves are services offered by authorities granted exclusive permissions to maintain these databases. These checks cannot be conducted by Finture and this will not be the case at any moment in the future. However, Finture invokes these checks by means of web services. Therefore these checks are considered optimally implemented in Finture and are omitted in the consideration of amelioration of the support for intermediaries.

The identification of main product criteria and the configuration of a mortgage by means of several mortgage parts is the expertise of the intermediary employee. This task is not supported by any third party solution at the moment. The selection of providers and products is currently facilitated by third party software solutions.

Intermediaries either export customer profiles from Finture to the advice software, or copy the details manually before selecting products, calculating the long-term effects and composing the advice report. This interaction between Finture and the third party solution causes a deficiency and risk of mistakes. The “Identify main product criteria”, “Select providers/products” and “Compose advice report” activities (Figure 29) are sub-activities within the “analysis and advice phase” of Figure 17.

The offer requests are assessed by the mortgage provider or its authorized agent in order to determine whether the customer qualifies for the requested product. This check results in an offer or in a turn-down of the request. When the result is negative, no offer will be sent out. This is a waste of time for all actors involved. When the intermediary would be able to predict by any means how the chances of success in requesting an offer would be, this would reduce the number of turned down advices, leading to a higher conversion rate for the intermediary.

The final acceptance check is focussed at checking whether the customer-details specified are valid. This is a manual task, conducted by the mortgage provider or its authorized agent. Since the focus of the final acceptance is to assess (physical) exhibits validating the details specified by the customer, this activity is hardly automated. The mortgage providers use this final acceptance to ensure their prospects conform to the norms they specified for their products, this check is maximally externalized to specialized actors. It does not fit in the Topicus or Finture strategy to offer the manual service of assessing exhibits. Therefore supporting the final acceptance check is of no interest for Finture and the activity is omitted in the remainder of this discussion. The transfer-activity as conducted by the notary falls outside the scope since it is recorded in legislation that a notary fulfils this activity, the several checks and composition of the deeds involved. Therefore this activity will be omitted in the remainder of this discussion.

Mortgage Advice and Offer Acceptance Check

Omitting the external registry checks, final acceptance check and transfer activities, leaves the Mortgage Advice and Offer Acceptance Check as the two unsupported activities that are of interest regarding analysis of possibilities for support by means of Finture. Assuming that both the Mortgage Advice and Offer Acceptance Check activities are completely automated and supported by Finture, the combination might add additional benefits. Advice presented to the customer may be more precise when tested against the acceptance norms at forehand. Advices that are destined to fail the acceptance test can be ignored during the advice phase, whereas alternatives that are likely to pass the acceptance check without manual processing may be chosen to speed up the process of acquiring a mortgage. By using the acceptance ‘service’ in the advice process, the intermediary might perform better in advising his clients, resulting in a competitive advantage for the intermediary. Considering the intermediary’s differentiation strategy, this is a very interesting opportunity. With the selection of these two sub-processes for in-depth analysis on support, the second and third research questions are

answered. The remainder of this thesis will analyze these two sub-processes in more detail and discuss and evaluate alternative solutions, ultimately leading to a recommendation on how to incorporate support for these sub-processes by means of Finture.

5.6. Synopsis analysis mortgage chain & Finture as-is

This chapter analyzed the overall mortgage chain and Finture as-is. This analysis is conducted by applying the BiZZdesign analysis approach. The specific means and modelling techniques in the analysis are derived from the Stage-Level framework introduced in chapter 3. The modelling techniques derived from this framework are actor diagrams, process-flow diagrams, architecture diagram and value-chain. Other means in the analysis consist of Interviews with Topicus-consultants, study of the mortgage industry and analysis Finture documentation. Application of these means in the analysis resulted in an understanding of the mortgage chain and Finture's current role in the intermediary's primary process. Comparing these two showed that all interactions between the mortgage intermediary and its chain-partners are supported by Finture. Concerning activities in the primary process, the mortgage advice is an important process-step that is not supported. Another interesting sub-process to support is the Offer Acceptance Check. However not directly part of the intermediary's process, support for this step would increase Finture's value-add since the quality of service offered would increase.

6. In-depth analysis Mortgage Advice

The previous chapter analyzed the Finture case and identified the Mortgage Advice and Offer Acceptance Check sub-processes as parts of the process that could be better supported by Finture, resulting in an added value for the intermediary organization. This chapter presents an in-depth analysis of the mortgage advice process, in order to define boundaries and the subject for the redesign phase. The analysis is conducted based the BiZZdesign analysis-approach and its three main concepts: actors, processes, and items. By applying this approach the main essentials in designing alternative solutions are identified, answering the fourth research question. The next chapter treats the Offer Acceptance Check process with the same approach.

6.1. Goal

The advice activity in the mortgage chain is intended to supply a customer with sufficient and objective information on possible alternative mortgage products, suitable for his specific situation. Based on this advice, most likely from multiple intermediaries, the customer can decide upon requesting an offer for one or more of the alternatives.

6.2. Actors

In the advice activity, there are three main stakeholders and two other actors. Their positions will be discussed in the next section. Figure 30 depicts the context of the mortgage advice activity as discussed before.

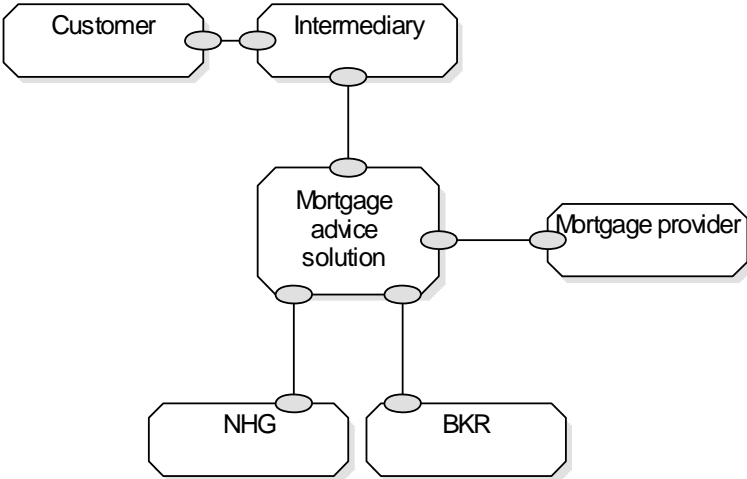


Figure 30 – Actor diagram Mortgage Advice

6.2.1. Customer

The customer searches the best product for his specific needs. Customers are looking for a mortgage in order to be able to acquire a specific real estate property. They are looking for a mortgage under acceptable conditions so that they will be able to pay off their dues with respect to their personal situation and preferences.

6.2.2. Intermediary

The *raison-d'être* for a mortgage intermediary is to sell mortgages to customers. Intermediary organizations receive a fee from mortgage-providers for every mortgage they sell. Their main interest is providing the customer with an attractive advice on products in their portfolio. However, legislation and self-regulation in the industry resulted in a set of strict norms to conform to for the intermediary [LEV04]. The intermediary must, for instance, register and motivate every claim, advice or suggestion given to the customer. The whole advice trajectory must be recorded in an advice-report, accepted and signed by both parties. This legislation and self-regulation has resulted from efforts to stimulate objective and honest advising, triggered by several incidents in the market with significant harmful results for many of the customers.

6.2.3. Mortgage provider

Mortgage providers use mortgages as an investment. They want to sell mortgages in order to receive return on their investments. Mortgage providers compose a product by means of its type (annuity, redemption-free, investment, life-mortgage etc.), interest-percentage and several other variables and conditions.

For all products they sell, a risk-profile is composed. This risk-profile forms a safeguard for the investment and define some norms customers must meet in order to be able to acquire the mortgage. Customers that do not match the risk-profile may not be able to pay-off their dues and therefore are of too high risk for the providers. In receiving a request for an offer, mortgage-providers test whether the requesting customer matches the norms.

6.2.4. Other actors

Besides these stakeholders, there are some more actors involved in the mortgage advice sub-process. Institutions like BKR and NHG offer services that will be invoked in order to determine whether the customer is feasible or qualifies for the National Mortgage Guarantee fund. These actors have no direct interest in Finture, except for offering their service.

6.3. Mortgage advice sub-process

The analysis of the customer’s situation and needs, wishes and plans define the starting point for the advice trajectory. With this information, the advisor uses his expertise to compose a mortgage structure suitable for the customer’s specifics. A mortgage is generally composed of several (1 to 5) mortgage-parts. The several mortgage-parts together form the whole of the mortgage. The parts usually differ in the redemption method, with different requirements regarding redeeming. For each of the mortgage-parts, different rates and norms apply. Together with the customer, the mortgage-advisor composes a structure that best fits the customer’s situation, both now and in the future. When the structure is defined, the next step is to find concrete products to realize this mortgage-concept. In this step the advisor uses his product-catalogue to search for providers and product alternatives. After selecting several alternatives, the different options are compared by calculating the effects on long term. Based on this evaluation an alternative is considered interesting or not. A new product selection/evaluation cycle may be started. The result of the mortgage advice step is an advice report. The process is depicted in the activity diagram below.

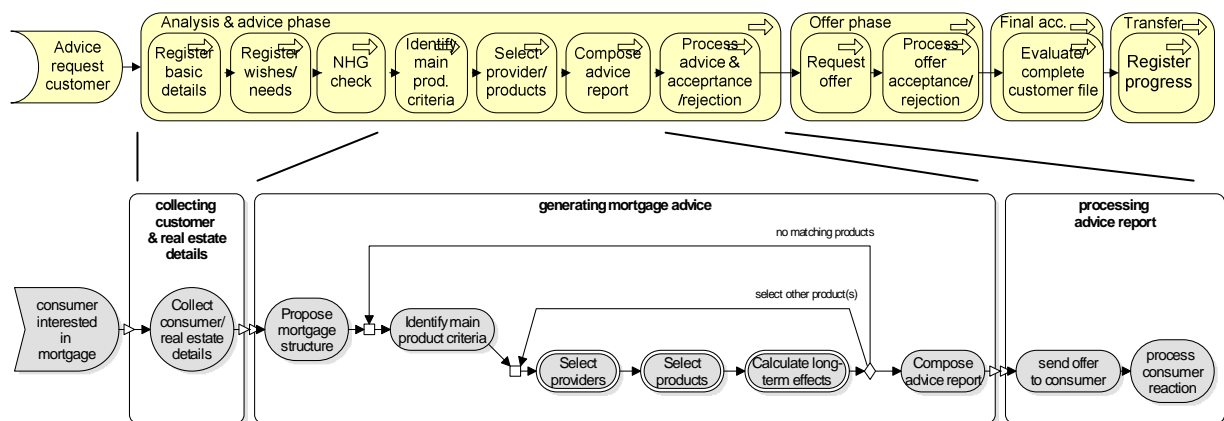


Figure 31 - Activities Mortgage Advice step

The advice report can be seen as a formal milestone. The *Wet Financiële Dienstverlening* imposes that the intermediary must meet some strict norms in advising a customer. He must be conscious of the personal situation of the customer, this specific personal situation must be the basis for the advice and every claim or advice made must be grounded. The advice report is the formal result, and in case of a conflict, this report is the only exhibit both parties can appeal to [LEV04]. In general, an advice report lists:

- all personal details used in the advice (name, income, assets, obligations, etc.) of the customer and eventually the partner
- a description of the needs, wishes and plans of the customer
- a description on the level of knowledge on financial products
- the actual advices alternatives, with motivations on the specific alternatives

This report will be signed by both parties and added to the customer’s record.

6.4. Knowledge/information involved

6.4.1. Required input information

In order to be able to compose a grounded advice on mortgage products the intermediary requires information and knowledge on personal details of the customer, the real estate object involved, the tax and social system and the several mortgage products in the intermediary's portfolio. This knowledge and information forms the items domain of BiZZdesign. Figure 32 graphically represents the required input. The asterisk in the relation between the advice process and the Advice report item indicates the *create* property. The other items are used as sources in this process.

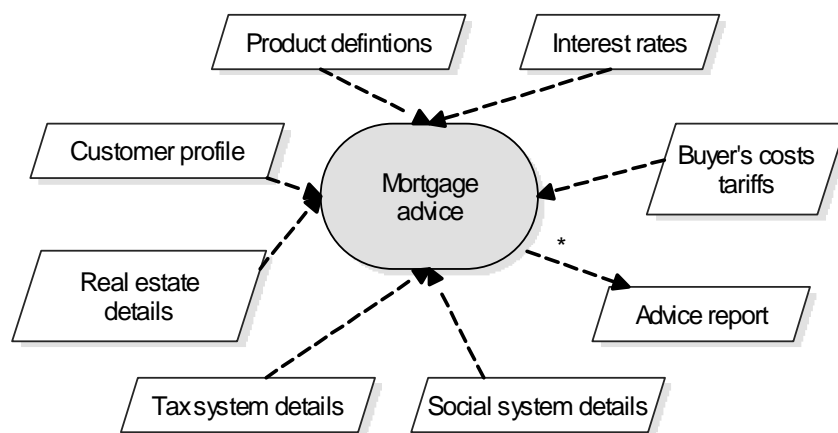


Figure 32 - Knowledge/information involved in composing advice

The following lists specify the required information in more detail.

Required customer information (similar for partner):

- personal details (name, address, age, civil state, etc.)
- personal details children
- income details
- current financial obligations (active mortgages, alimony, debts)
- pension details
- personal fiscal details (tax-deductible expense, levy reductions)
- current personal resources
- details on current real-estate property
- expected development of situation (financial and personal)
- wishes/goals/plans of the customer (risk-profile, cost-profile)
- knowledge level on financial/economical aspects

For the real-estate object involved, the following information is required:

- type of object (new housing estate, existing estate, apartment)
- appraised value acquisition
- appraised value maintenance/renovation
- maintenance condition of the object

In order to calculate the buyer's costs, indications for the following rates should be available:

- Notary costs
- Appraiser costs,
- Broker's commission

These rates can be defined by the market and can thus differ between different actors. However, market-forces stabilize the rates.

In order to calculate the financial effects of suggested alternatives, information on the fiscal and social systems is required. This includes information on:

- levy percentages
- tax-deductible expense
- levy reductions
- effects of incapacity, dismissal

Based on these parameters and information, a mortgage advisor can propose a mortgage-configuration, defining the several mortgage-parts and their values. This aspect is the specific expertise of the advisor. Selecting the best mortgage-configuration is very complex and currently not supported by any IT-means (neither Finture nor third party advice software). Depending on the specific situation and wishes of a customer, a configuration is composed. When a specific configuration is defined, the next step is to select mortgage-providers and products to 'implement' this mortgage configuration.

In order to select upon product alternatives for the advice, specific information on the products in the portfolio is required. This required information includes:

- definition of check-income (which income components are included, which are not)
- mortgage(part) type
- check-interest
- progressive/non-progressive development
- interest rates (under variable and fixed conditions)

Based on the historical developments of the interest-rates, forecasts are made to predict interest rates for the life-time of the mortgage.

The product definitions are strongly related to the norms that will be discussed in section 7.4.1.

6.4.2. Sources & Frequency of change in input knowledge/information

The required knowledge and information listed above must be up-to-date in order to be useful, therefore changes must be noticed and the sources must be updated. The following section discusses the frequency of change and the way changes are communicated.

Customer & real estate details

The customer and real estate details differ, by definition, for every 'instance' of the process. These details are provided by the customer and an appraiser. It is the responsibility of the customer that this information is correct, this correctness will eventually be validated in the final acceptance check by the mortgage provider.

Tax & social system

The tax and social system details do not change very frequently, only once every few years. These changes are communicated by the Treasury or Ministry of Finance. These changes can have significant influences on the mortgage-advice trajectory. Small changes like tax brackets rates are quite straightforward, but more complex changes in for instance deduction or tax on salaries might have large implications on the long term mortgage calculation algorithms.

Buyer's costs rates

The buyer's costs rates are released to the market, this means the actual percentages vary. However, market-force stabilized the percentages, making it very well possible to use general indicators. The indicators will not change frequently.

Product interest rates

The product's properties will change more frequently, in particular the interest-rates. These rates can change every few weeks. It is reasonable to assume that the rates for a random mortgages change every two weeks [HDN07]. When the platform contains several products of several providers, the rates must be checked and probably updated daily.

These interest rate changes are communicated by mortgage providers to anyone interested. Via the provider's websites, customers can get an insight in the current rates. Several organizations and websites offer bundled overviews of interest-rates of all mortgage-providers and all their products. These overviews get updated daily.

Product definitions

Changes in product-type or definition other than the interest rates do not occur very often. More often new products are defined, or existing products are discontinued. These changes are communicated directly between provider and intermediary (or purchaser's association). Since practically all intermediaries use software in their advice trajectory, containing the product definitions, the software vendors maintain and update these definitions. In case of modification, they will publish updates of their product databases [LEV04], [INF07].

6.4.3. Calculations

The advice step performs several calculations based on the input information. Initially, the generic costs in case of a transfer will be calculated, based on the value of the property and the requested amount of money in the mortgage. These costs are the buyer's costs (in Dutch referred to as "kosten koper").

The Buyer's costs consist of:

- Broker's commission
- Appraiser costs
- Notary costs
- Transfer taxes
- Financing costs (optional)
- NHG contribution (optional)

Calculating these costs is very straightforward. These costs are all percentages of the value of the property or the requested mortgage value. The percentages differ per value-range of the property and requested mortgage value. An increasing value leads to a decrease of the percentage.

For the selected alternative mortgage-scenario's, the situation for the lifetime of the mortgage (30 years in general) is calculated. These situations are described by means of:

- Gross and net mortgage costs per year and month
- Development own equity (tax-box 3)
- Development dept and interest parts of mortgage
- Gross and net year income, based on expected income development, tax system

Depending on the products in the scenario, additional calculations on insurance contributions might be included. This includes:

- Contributions save/life mortgages
- Contribution obituary insurances

In principle these values are calculated based on the (expected) income in year 1 to 30 (assuming a 30 year lifetime), the costs for the mortgage (both interest and repayment) and the effects on the tax assessment. These are the main components in these calculations. The actual calculations are more complex, since they should embody the tax and social system, with specific rates and conditions for several situations.

Based on these calculated parameters, the customers can compare and decide upon the effects of a specific alternative for their (financial) situation.

6.4.4. Relation product definitions and calculations

The product definitions and calculations are strongly related. The calculation algorithms interpret the product definitions in order to calculate long-term development of debt, interest and the disposable income. The product definitions specify which income components are allowed for the specific product. Based on this set of components a check income is defined, which will be used for financial development estimations used in the long-term financial planning.

There is no generic product definition standard in the market. Calculations implemented in independent advice software solutions like Nationaal Woonpakket [EFD07], Hypobox [INT07] and AfinPro [INF07] use their own ways to define products and calculations. This means that the definitions of products and the implementation of calculations using these definitions are strongly related and are not directly interchangeable.

6.4.5. Information produced

The advice step results in a set of mortgage advices. This consists of one or more mortgages, each consisting of one or more mortgage-parts. This information can be stored in the current Finture data-model. Currently, advice produced by external advice software can be stored by importing the resulting HDN message. This message is parsed and translated to the Finture data-model. Since HDN is the standard on communicating mortgage offers (and offer-requests), the ability to store the information contained in HDN OX-messages [HDN07b] should suffice in supporting the advice process. Additional information cannot be communicated automatically by means of HDN.

6.5. Current situation

Currently, Finture provides interaction possibilities with third-party advice software using the HDN standard [HDN06]. Finture can communicate customer profile data with TP advice software using a predefined XML message (e.g. Nationaal Woonpakket by ÉFDÉCÉ [EFD07], [KRA05b]) or manually by the intermediary employee. Figure 33 represents the current support for the Mortgage Advice sub-process. The “Advice generation” and “Advice registration” services are realized by respectively third party advice software and Finture, interacting by means of HDN AX messages.

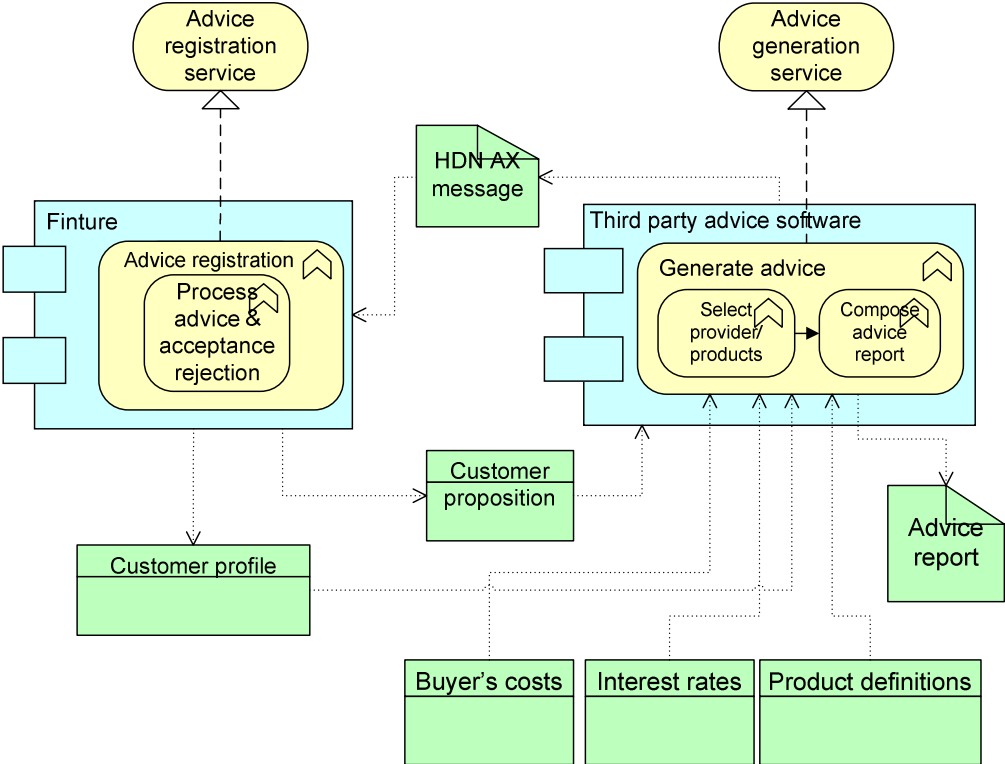


Figure 33 - Current situation in composing mortgage advices

Figure 29 provides an overall view of the current situation.

Finture contains basic product definitions of several providers. When the information available in Finture is communicated with the advice software, the intermediary uses this system to compose an advice, resulting in an advice report. The main advice systems offer functionality to request an offer for an advised alternative, by sending HDN AX messages [HDN06] to providers. Finture uses this concept to retrieve the advised products from the advice software. Figure 33 depicts the interaction with third-party advice software. On receiving the HDN AX message from the advice software, Finture derives the advised products from it, and maps these to the internally available products. The Finture proposition then contains the advised products and can flow further through the process using Finture.

6.6. Requirements

This section describes the main requirements the implementation of support for Mortgage Advice in Finture must meet. All alternatives proposed will be assessed on these requirements. The main requirements will be labelled with a R-number, summarized in the concluding sections of this chapter.

6.6.1. Functional requirements

The outcomes of mortgage advice (generated advice report) in Finture should at least be of the same quality as the current solutions in the market. Delivering outcomes with less accuracy does not add any value to the intermediary, the advice should be trustworthy and complete. Customers will make decisions based on the advice. This means that Finture's solution must deliver at least the same information with at the least the same accuracy and completeness as existing solutions do (R1). This requires the availability of all the information and knowledge involved in the calculations (R2).

In order to increase efficiency and throughput, the user should not have to conduct any manual steps, as with the current situation (R3). The advice must be produced instantly after composing the customer-profile and selecting product (-parts).

6.6.2. Non-functional requirements

According to the ISO 9126 standard (international standard for the evaluation of software) [ISO91], a set of non-functional requirements is defined for the advice step.

Reliability

The advice-solution should be available whenever Finture is used (R4). This means the solution should be available between 8:00-21:00. Finture provides a SLA with 99.7% uptime, which implies a maximum of 6 hours downtime per quarter [SLAS07]. In case of errors or failure, Finture must be back in operation within 2 hours with a work-around and within 2 days with a definitive solution [SLAS07].

Usability

In automating mortgage-advice, the aim is to realize a completely automated situation, where no additional manual-tasks are to be performed, other than explicitly starting the advice report generation (R5). Usability requirements on the human-aspect are therefore not very applicable to this case, since all interactions take place at application-level. Regarding interactions with other applications, "usability" might be relevant. Depending on the solution alternative, application interactions might be necessary. In this case, there must be a protocol or communication standard to facilitate the exchange of information.

Efficiency

In automating the advice-step, it is necessary to have the calculations within minutes, so that the customer can wait for the results. Otherwise, the value-add in efficiency in incorporating advice is very limited. For the maximum allowed waiting time 30 minutes is defined (R6). This is a long time for a customer to await the advice report and is thus considered an absolute maximum. The solution should be optimized for performing the calculations. Since many users might use the system simultaneously, conducting costly calculations might put a burden on the performance of the system as a whole. This should be taken care of.

Maintainability

When the tax or social systems change, these changes must be adopted by the advice calculations. These changes will be communicated way up front. The definitions of the calculations, product definitions and the other data required must be flexible, so that they can be adapted before the new systems apply (R7).

Portability

Portability in terms of operating system is not relevant for Finture components. Since Finture operates on a specific platform (.NET) it is bounded to a specific platform. Porting Finture is out of question, this will also apply on the advice-solution. However, portability concerning data-exchange might be relevant. Since technology changes rather quickly, and standards are being developed, it might become necessary to port the data-exchange mechanisms to support new standards in the (near) future.

6.7. Conclusions on in-depth analysis mortgage advice sub-process

The main purpose of the mortgage advice sub process is to provide the customer with an overview of long-term effects of selected mortgage products for its personal financial situation. Based on these long-term effects the customer can compare products and decide upon the alternatives.

In calculating the long-term effects of selected products, several information sources are required. First of all, the customer profile specifying details on the personal and financial position of the customer and details on the real-estate property and mortgage required. Secondly, specific characteristics of the selected products, specifying (among others) the development of interest and debt and defining the income components accepted in the check income. Thirdly, details on the tax and social systems must be incorporated in the calculation. This is required in determining the gross and net income for every year of the life-time of the mortgage. A fourth important data source is the (forecasted) interest-rate for the selected products. Based on these values, the development of interest to be paid is determined, essential in determining the financial position of the customer in every year of the mortgage's life-time. The final information source is the collection of buyer's costs tariffs. These tariffs represent the fees and taxes to be paid to the several actors involved in a transfer (notary, appraiser and broker). By including this information, the effects of the selected mortgage products for every year in the life-time of the mortgage can be calculated, defining the free disposable value for the customer.

The quality of the calculated effects and thereby of the advice service depends primarily on the accuracy and completeness of this information. The five information sources have different suppliers, different update frequencies and updates are communicated by different means.

Due to lack of standardization in product definitions, the calculations and product definitions are considered to be closely related. The calculations expect product definitions in a certain (non-standardized) format. This implies that the product definitions cannot be acquired from third parties easily at the moment but will be associated with the calculations.

There are several functional and non-functional requirements for the incorporation of Mortgage Advice functionality in Finture, these requirements will be prioritized and used in comparing the design alternatives.

Chapter 8 discusses the BiZZdesign redesign approach for this advice sub-process. Based on the analysis provided in this chapter, solution alternatives are defined and compared, ultimately leading to the proposition of one of the alternatives.

7. In-depth analysis Offer Acceptance Check

This chapter analyzes the Offer Acceptance Check sub-process in more detail, by the same means as the previous chapter analyzed the Mortgage advice process. Based on this analysis, the main essentials required in a solution providing support for this sub-process are identified. Chapter 9 will propose design alternatives for this support solution.

7.1. Goal

During the final acceptance assessment of a mortgage offer, mortgage providers check whether a customer can acquire the requested product. In this step the provider validates the specified details by (manually) examining exhibits, like for instance an employer's certificate. When this check passes, the mortgage is provided; otherwise the request is turned down.

This manual checking in the final acceptance check is a time-consuming and expensive activity, a turned down request is a waste of money. Therefore mortgage-providers check every request for offer in order to determine whether a customer qualifies for a certain product. Turning down a request in this phase is less expensive than later on in the process. When an offer is sent out, and the customer accepts this later on, the final acceptance check suffices to check whether the specified details are correct rather than whether the details match the norms.

In order to be able to check whether a customer qualifies for a product, his personal details, and details on the pawn and requested value are checked against norms specified for a particular mortgage product. When this check is positive, the offer is sent out. When this check is clearly negative, the request is turned down. When there is an ambiguous result, the request is processed manually.

Mortgage providers tend to automate this check as much as possible. As Argenta (a mortgage provider on the Dutch market) states in its acceptance document entitled "Hypotheek Nederland Acceptatiebeleid" (translated): "This manual is composed in order to process as much credit requests as possible by means of automation" [ARG05]. Stater claims that they process nearly 85% of the requests automatically, the remainder is processed manually. However, they do not mention the success-score of the automatically processes requests.

The specialization in the mortgage industry led to the occurrence of authorized agents on the field of offer acceptance. Mortgage providers authorize external service organizations to complete this acceptance check. This outsourcing reduces workload for the providers, and the agents can increase operational excellence by means of specialization and automation. An example of such a service operator is Stater N.V. [STA01]. This trend may be interesting for Finture, acting under an offer-mandate Finture can present an added value for both the intermediary and the provider.

7.2. Actors

In requesting an offer, three different stakeholders are involved, the customer, the intermediary and mortgage-provider. Since the service operator (like Stater, discussed in the previous section) conducts tasks of the mortgage-provider, this section treats them both as a single actor, being the mortgage-provider.

7.2.1. Customer

After being given an advice, the customer decides to either neglect the advised products or request an offer for a specific product. This latter situation means the customer is interested in the product and wants to receive a concrete offer with firm rates in order to make a final decision. Customers want to receive the offers as soon as possible, since they have to make a decision on buying the property. A turned down offer is a waste of precious time for the customer.

7.2.2. Intermediary

Intermediaries can request offers for their prospects at the mortgage-providers. These offers can be requested by paper forms or via HDN, the *mortgage data network*. This HDN-standard provides an infrastructure for sending and receiving offers for mortgage products between intermediaries and mortgage providers or their authorized agents [HDN07]. After receiving an offer, the intermediary organization communicates it with the customer.

7.2.3. Mortgage-provider

The mortgage provider receives a request for an offer and wants to determine whether the customer qualifies. By matching the customer’s record with the several norms applicable, a result on whether to send out the offer is determined.

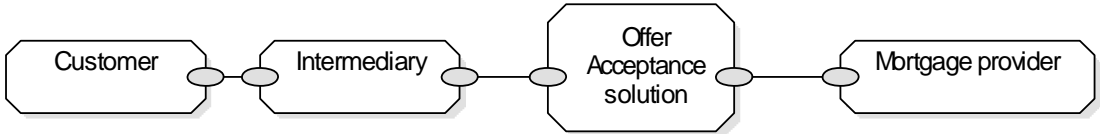


Figure 34 – Actor diagram Offer Acceptance

Figure 34 depicts the context for the Offer Acceptance Check.

7.3. Offer Acceptance Check sub-process

After completing the advice trajectory, a customer can decide to request an offer for a specific mortgage-product. Usually, the customer asks the intermediary to initiate the request. However, with the current rise of internet-mortgages, the number of mortgage providers offering online offer-possibilities increases.

When a mortgage-provider, or its authorized agent, receives a request for an offer, it checks whether the request itself meets the technical requirements for a request. This is a check on availability of the required information and the conformance to the (technical) standards for the offer-request. When this check fails, the request is turned down; otherwise the actual acceptance check on the contents of the request is initiated.

In the actual acceptance check, the mortgage-provider basically determines whether the customer involved can acquire the requested mortgage for the real estate object involved. The provider checks whether the norms defined for a product are met by the customer. In this check, the mortgage provider does not validate the specified information as it will in the final acceptance check. The information as supplied by the customer is assumed to be valid. A positive result of this check is a conditional acceptance, assuming that the supplied details are correct, the mortgage can be provided. Validation of the details takes place in the final acceptance check.

This Offer Acceptance Check will either result in a "yes", "no" or "maybe" qualification, indicating the success, failure or "subject for debate" outcome. In case of the latter situation, the request will be delivered to an acceptor who will manually process the request and determines if the customer is qualified for the requested product.

The offer acceptance check can be divided into three subsequent steps:

1. check against general code of conduct for financial market
2. check against provider-specific norms
3. check against product-specific norms

The general code of conduct describes a set of basic norms every provider is obligated to conform to. The norms in principle apply to the process and attitude of the providers. However, they do imply some norms for the customer. An example of a norm specified in this code is the maximum mortgage-value a mortgage provider can actually provide to a customer, according to his financial situation. This is a measure to protect customers. Other examples of norms in this code are definitions on how to calculate the actual interest percentage and the set of information to be provided to the customer [GHF07].

The provider-specific and product-specific norms are similar in their contents. However, they differ in the subject they apply to. Provider-specific norms apply to all products of the provider (but can be overruled by product-specific criteria) whereas product-specific criteria apply on a single product.

In general, the provider-specific rules present some definitions on how to calculate check-incomes and define which type of real-estate objects are acceptable as a pawn. Depending on the provider, it can contain more concrete criteria applicable to all products.

The product-specific criteria for instance specify the maximum mortgage-value, the maximum redemption-free value and insurance requirements.

Figure 35 represents the activities in the Offer Acceptance Check. The Code of Conduct check either leads to a 'request turned down' or 'accepted' result. The provider and product-norms checks result in a 'request turned down', 'subject of debate' or 'accepted' result.

Since these activities outside the intermediary's process, the relation with the intermediary's process cannot be depicted.

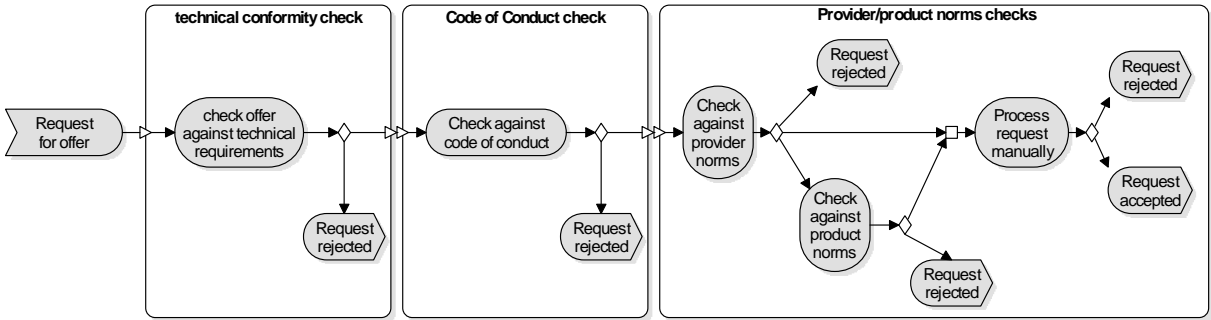


Figure 35 - Activity diagram Offer Acceptance

By analyzing the product specifications and norms of 8 different mortgage providers, a list of generic aspects that are subject in the acceptance check is composed. The providers studied are Fortis ASR, SNS, Direktbank, GMAC, Erasmus Hypotheken, Argenta, Bank of Schotland and UCB. From this list of providers, only the products of Erasmus Hypotheken are not available within the Finture application. However, their norms show great resemblances with the others and are therefore considered representative.

The aspects involved in the offer acceptance check are generally divided into three categories. First of all there are norms on the customer requesting the mortgage. Secondly there are norms on the *pawn* involved and finally there are norms on the requested *mortgage* and its specific redemption conditions.

The aspects that are generally subject of the norms are listed below in a little more detail:

Customer

- Identification
 - o age
 - o nationality
 - o number of requesters (partners)
- Income
 - o income components
 - o contract of employment
 - o financial obligations (BKR status)
 - o current resources

Pawn

- Type of real estate object
- Maintenance status
- Buying price living expenses insurance
- Renovation costs
- Financing living expenses insurance
- Leasehold term
- Appraisal details

Mortgage

- Requested amount
- Fixed interest term
- Interest structure
- Term (life time)
- Risk coverage by insurances
- NHG possibilities

The norms define a certain bandwidth for the several variables, like for instance: 'age > 18' or 'pawn may not be requested for a trailer'. These norms can be severely complex and nested various levels deep, specifying several cases, exceptions or conditions.

Depending on the specific focus and niche of a mortgage provider or product, the application of the norms differs. Mortgage providers like SPARCK offer mortgage products for customers that cannot acquire an ordinary mortgage, since they are entrepreneur or have a credit-registration [SPA07]. The acceptance of this type of customers is less formal in terms of norms to be passed. These mortgage providers will have a larger number of manual acceptance-instances.

7.3.1. Negotiable norms

The norms of a mortgage provider or product seem very strict. However there is a margin the acceptance-employees operate within. This bandwidth can be used by an intermediary to negotiate with the provider. When the provider receives an indication on the acceptance results he might identify some aspects that are negotiable and can try whether there is any room for the customer to profit from.

7.4. Knowledge/information involved

This section discusses the items domain for the offer acceptance. Defining the information and knowledge involved in conducting the checks.

7.4.1. Required input information

The offer acceptance check requires the following information, as depicted by Figure 36:

- Customer profile
- Real-estate object details
- Code of conduct & NIBUD living expense percentages
- General provider norms
- Product-specific norms

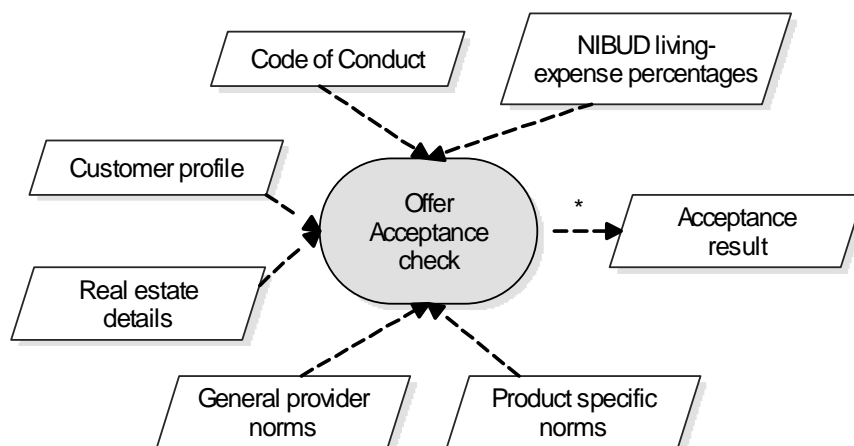


Figure 36 - Information involved in Acceptance check

In this diagram, the asterisk indicates the *create* property of the acceptance result. The other items are used as sources in the process.

7.4.2. Sources & Frequency of change in input knowledge/information

Customer profile & real-estate details

The details of the customer and the real-estate object involved differ for every case. It is the responsibility of the customer that this information is accurate and complete. During the eventual final acceptance, this information is validated.

Code of conduct & living expense percentages

The code of conduct for mortgage-providers is first introduced in 2003 and intensified as of January 1st, 2007. The code of conduct makes use of an external source, being the living expenses overview of the National Institute for Budget Information (NIBUD) [GHF07]. This institute provides overviews of the maximum acceptable percentage of living costs for ranges of income. These percentages are updated every year.

Provider & product norms

Norms as applied by the mortgage-providers are company secrets, since they imply the boundaries the product operates within and define the negotiable margins. Therefore, the norms are severely protected. Mortgage providers either publish basic conditions for the mortgage or black-box applications to external parties like advice software vendors. The black boxes contain a detailed set of checks, whereas the published conditions only describe some basics. With these black-boxes, software like HypoBox can check against norms.

It is difficult to specify an interval for the updates of the norms, since this information is not publicly available.

7.4.3. Information produced

The result of the acceptance check is a list of checks and their respective results, leading to an overall result indicating whether or not the offer acceptance check is passed. It might be useful for the intermediary to get an overview of the checks that did not pass, so that he can determine whether the check might be negotiable with the provider.

The result of the check can be communicated using a HDN SX message. This message-type is intended to communicate status indications with additional remarks (up to nine lines). There is a default "Offer request rejected, see explanation" status. The nine remark fields can be used to store details on the conflicting norm(s) [HDN07c].

It is not very useful to store the outcome of the acceptance check in Finture. The outcome of the check depends fully on the specified information, so changes of customer details, are likely to result in a different outcome. The check can better be executed whenever the check-results are required, this guarantees that the most recent information is considered in the check.

7.5. Current situation

Intermediaries using Finture currently do not have an offer acceptance procedure available other than the check by the provider (or its authorized agent). This means the intermediaries have to act based on their experience and expertise.

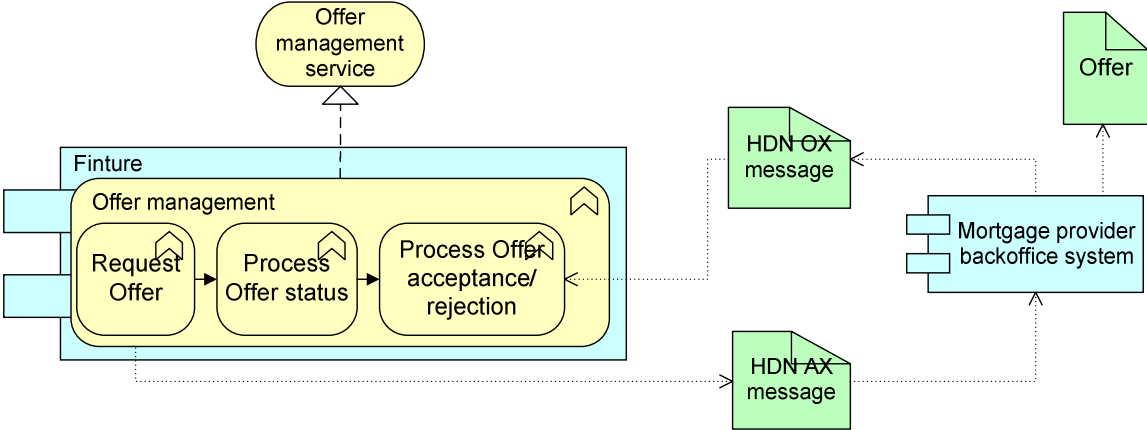


Figure 37 - Current situation Offer Acceptance

When the customer indicates he wants to receive an offer for a particular product, Finture can request an offer sending a HDN AX message to the provider. After this request, the mortgage responds by providing either the offer or a rejection by means of a HDN OX messages. Only after receiving this HDN OX message, the chances of success for acquiring the mortgage is known.

7.6. Requirements

The following sections will describe the main requirements the implementation of the Offer Acceptance Check in Finture should meet. The alternatives proposed will be assessed on these requirements. Every requirement will be labelled with a R-number.

7.6.1. Functional requirements

The Offer Acceptance Check should check propositions against the specific provider and product norms (R1). The Offer Acceptance Check should preferably be accessible from multiple situations in the system (R2). During an advice calculation the check can be used to assess products at forehand and after selection of a specific product to determine whether an offer is likely to be provided.

The check-algorithm may not result in false rejections of offer requests (R3). The costs of a falsely rejected offer request outweigh the costs of a falsely accepted request.

The result of the check is only of any relevance when the norms checked against are accurate and precisely defined in the system. Otherwise the results would contain a certain amount of

uncertainty, providing minimal value-add to the intermediary. This requires accurate definition of norms (R4). Providers have different norms, formulated differently applying on somehow the same aspects. All these differences should be captured and overcome in order to be able to offer check-functionality for the several providers and their products.

All the norms should be maintained and updated regularly (R5). This can be initiated by the addition of new providers or products or when providers update their norms. This requires some norm-maintenance front-end for the system's operators, enabling the dynamic specification of norms.

The check should be operated with no manual interactions required (R6). By specifying a customer profile and a set of selected products, the response must be given.

7.6.2. Non-functional requirements

According to the ISO 9126 standard (international standard for the evaluation of software) [ISO91], a set of non-functional requirements is defined for the Offer Acceptance check functionality.

Reliability

The offer acceptance check will be an important function within the Finture application. Unavailability of this function can cause the system to be unavailable. Therefore this component is required to operate at Finture's service level regarding availability (R7). The results of the check should be very reliable. As indicated above, a false rejection is costly and these occurrences should be minimized.

Usability

This functionality is aimed to be completely automated (R8). This means usability requirements in terms of human-machine interactions do not apply on this component.

Efficiency

Since this functionality will be invoked within the Mortgage Advice procedures, the response should be available largely within the 30 minutes response time of the advice functionality (R9). Otherwise the advice functionality might not meet the response requirements.

Maintainability

The norms must be maintainable by the system's operators rather than Topicus developers (R10).

Portability

Portability in terms of operating system is not relevant for Finture components. Since Finture operates on a specific platform (.NET) it is bounded to a specific platform. Porting Finture is out of question, this will also apply on the offer acceptance-solution.

7.7. Conclusions on in-depth analysis Offer Acceptance Check

The main purpose of the Offer Acceptance Check in the mortgage process is to act as a 'gate keeper' for the mortgage providers to ensure that customers clearly failing to meet the requirements for a certain mortgage product, do not receive an offer for this product. This reduces work in the later staged final acceptance check and thereby improves the efficiency and conversion rates for the mortgage provider. By offering this Offer Acceptance Check service in Finture, intermediary employees can get an indication whether the customer meets the requirements at forehand, during the advice phase or when considering requesting a mortgage. This increases the quality of the service delivered by the mortgage intermediary, since the products the customer clearly does not qualify for will not be advised and requested offers for.

The Offer Acceptance Check can be seen as a three-step check. The first check is to determine whether the offer request meets the technical requirements on the communication standard and the availability of required information. The second check is to check against the general Code of Conduct for mortgage providers. This code defines the maximum ratio between a customer's income and the mortgage value. When this check is passed, the request is checked against the provider's and product's specific norms. After this check, the request is either accepted, rejected or subject of debate. This latter result implies that the request will be assessed manually by the mortgage provider or its authorized agent.

Regarding evaluating the design alternatives, several functional and non-functional requirements are proposed. These requirements will be input in a comparison framework to assess the alternatives upon. Chapter 9 discusses the BiZZdesign redesign approach for this Offer Acceptance Check sub-process. The main concerns and requirements listed here will specify the solution space the alternatives should fit within.

8. Redesign approach - Mortgage Advice

This chapter and the next present the results of the BiZZdesign Redesign approach, resulting in a recommendation for extensions of the Finture platform leading to a better support for the two aforementioned activities. This chapter will discuss support for generating mortgage advice, following the structure of the BiZZdesign redesign approach. This chapter answers the fifth research question for the mortgage advice functionality.

8.1. Determining range

As the analysis in Chapter 6 showed, the mortgage advice process is inefficient since third party software is used. Intermediary employees have to export or manually copy customer-profile information to the Third Party system. This takes quite some time and may introduce mistakes in the synchronized data. This section will discuss the environment of the change process, resulting in a demarcation of the redesign project.

8.1.1. Goal redesign project

The goal of this redesign project is to discover several alternative solutions, and select the best solution to incorporate support for composing a mortgage advice report in Finture. When this report is produced by Finture, employees of the intermediary are better supported in advising their customers. In the situation strived for, a given advice is at least as good as with the current third party solutions but with less effort of the intermediary employee.

8.1.2. Magnitude of change

Supporting the mortgage advice with Finture should be classified as a level-1 change type in terms of BiZZdesign. There are no significant adjustments to the process flow as such, but the advantages come from a more efficient support of the processes and their interactions.

8.1.3. Impact of change

The following table presents the expected impact of the change for the organization as a whole considering the redesign goal. For each of the COPAFIJTH aspects [BRU00], the consequences of supporting the mortgage advice sub-process by Finture are discussed. This table provides an insight of the aspects expected to experience effects of the change project. By evaluating the expected effects, the redesign goal might be adjusted, in order to realize a better (expected) situation.

Corporate aspect	Element	Specification
Commerce	Competitiveness	Remains equal or slightly improves due to better advice, only on the long term
	Market position	Maximally slight increase when advice

		service improves compared to current TP-solutions, only on the long term
	Customer relations	No change foreseen
Organization	Structure	No change foreseen
	Culture	No change foreseen
	Flexibility	Improved, since advice functionality can be included in task-role assignment engine of Finture.
Personnel	Characteristics of personnel	Manual export operations of employees are automated; this lightens IT-skill requirements personnel. Personnel should be educated to work with the new functionality.
	Job profile	No change foreseen
	Job assignment	No change foreseen
Administrative Organization	Process logic	No change foreseen
	Process structure	No change foreseen
	Task structure	Manual steps in calculating advice are automated; task descriptions in generating advice reports should be changed.
	Process control	No change foreseen
Finance	Financial position	No change foreseen
	Operational costs	No additional third-party software licenses required.
Information	Information supply	Information exchange between Finture – TP software is omitted, reducing risks of failure/errors.
	Information requirements	No change foreseen
	Information match	Reducing system-interactions reducing matching failure risks.
Legal aspects	Legal dependency	No change foreseen
Technology	Technology quality	Improved since chance of failure/mistakes in exchange of information is reduced.
	Technological appropriateness	Improved, supported flow better suits the process.
	Technological flexibility	Improved, since advice functionality can be included in task-role assignment

		engine of Finture.
Housing	Geography	No change foreseen
	Ergonomics	Improved, a single application can be used.

Table 6 - Impact of change supporting Mortgage Advice with Finture

These expected changes conform to the research goals and form no trigger to adjust the redesign goals set.

8.1.4. Defining range

The scope of this redesign project is very limited. The input is given, being the customer profile with all its details and a set of main product criteria. The output is known at forehand, being the advice report with its strict contents (see 6.4.4). The process in between, generating the mortgage advice report, is subject of the redesign project.

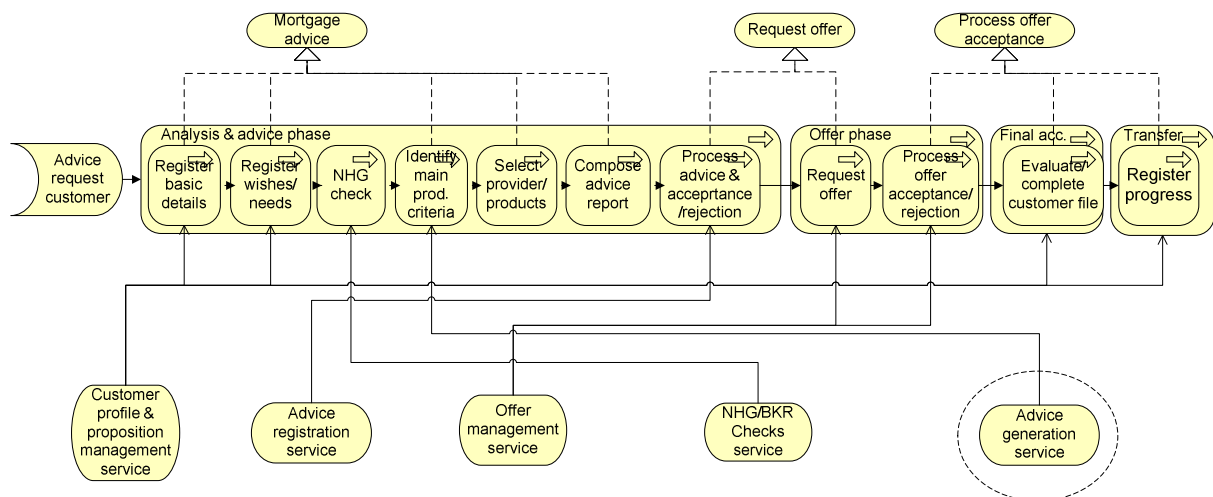


Figure 38 - Range redesign project Mortgage Advice project

Figure 38 displays the subject in the design project, the dashed circle surrounding 'advice generation service'. Realizing this service by Finture is the situation aimed for.

8.2. Determining essentials

The calculation of the long-term implications of a selected product for a specific customer's situation is very complex. These calculations require advanced knowledge on the current tax and social systems, and several information sources for tariffs, product definitions and interest rates. This knowledge and information must be available and kept up-to-date. The calculation-logic and storage and maintenance of data-sources are the two main components of the mortgage advice. These components are the main essentials required in every alternative. The main question in defining solution alternatives is where to position the (responsibility for maintenance and availability of) the logic and data-source components.

8.3. Design alternatives

The previous sections discussed the range and requirements concerning the redesign. This section presents several alternative solutions in implementing the functionality.

There are two main components in composing an advice report:

- The logic, containing the complex calculations in order to determine the long-term effects of a selected product for a customer's financial situation.
- The information sources providing the required information to complete the calculations

Chapter 6 discussed these two in detail.

As discussed in section 6.4.4, the product definitions and calculations are strongly tied due to the lack of a standard on defining mortgage products. Mortgage providers and software developers all use their own means and standards in defining and representing mortgage products. The calculations make use of several product characteristics, mainly to determine which components to include in check income (e.g. overtime, bonuses, alimony, 13th month, and pension). These characteristics are required in calculating accurate outcomes. This implies that calculations and product definitions cannot be exchanged easily amongst different actors and thus cannot be treated as distinct components in the analysis of design alternatives for generating mortgage advice reports. In the discussion of the alternatives, the calculations and product definitions are considered as one.

The data-sources as referred to in this section contain details on the interest-rates and buyer's tariffs.

For positioning the logic and data-sources, three different alternatives are identified for both.

Alternative locations Logic component:

1. internal, build in support in Finture application
2. external, using third-party software on the local ASP platform. Updates are responsibility of third-party
3. external, using third-party software remotely (e.g. web-service)

Alternative locations Data-sources:

1. internal, maintaining and updating internal database
2. external, using third-party software on the local ASP platform. Updates are responsibility of third-party
3. external, using third-party software remotely (e.g. web-service)

Combining the alternatives for these two components defines the several implementation alternatives. Combining the 2 * 3 alternatives provides in principle 9 alternatives. However, it is rather unlikely that when a third-party offers a web-service for mortgage advice (Logic alt. 3), that the interest rates and buyer’s costs tariffs are not included. Therefore the alternative of external logic is only combined with remote data-sources (Data-source alt.3). The same reasoning is valid for invoking a third-party product on the local ASP platform. Providers of advice software provide updates for product-definitions and interest rates in order to keep their systems up-to-date. So alternative 2 for the logic component is only combined with using a local TP data-source (Data-source alt. 2).

Figure 39 represents the alternative configurations for implementing both logic and data-sources. The unlikely configuration-alternatives are marked as such.

Location of logic	External, remote	unlikely	unlikely	5
	External, on Finture ASP	unlikely	4	unlikely
	internal	1	2	3
		internal	External, on Finture ASP	External, remote
		Location of data-sources		

Figure 39 - Combination alternative logic & data-source configurations

This leaves five different alternative combinations for the logic and data-source configurations, as depicted by Figure 39:

1. Building both the logic and data-sources into Finture, maintaining calculations, product definitions and information sources internally
2. Building logic into Finture, consulting external sources on the local platform for interest rates and buyer’s cost tariffs
3. Building logic into Finture, consulting remote sources for interest rates and buyer’s tariffs
4. Invoking third party advice software on the local ASP platform, for both logic and data-sources
5. Invoking online web-service for both logic and data-sources

The following sections discuss these five alternative solutions for the incorporation. Each of the alternatives will be discussed in terms of:

- Position of the logic and product definitions. Who is responsible for implementing and maintaining the product definitions and the representation and maintenance of tax and social systems in the calculations?
- Position of the interest-rates and buyer's cost tariffs source. Who is responsible for maintenance and updates on this information?
- Communication between Finture and external actors involved. How can data exchanges with external actors be supported?

For each of the alternatives, requirements and assumptions are explicitly listed.

8.3.1. Alternative 1: Including all logic and data-sources in Finture

The first alternative positions the calculations and product definitions as well as the interest rates and buyer’s cost tariffs within Finture. The current data-model contains objects for products (“MaatschappijProduct” and “TussenpersoonProduct”, where the latter extends the first). Either one of these objects would be the place to store the product definition information, depending on whether a specific product is a generic provider product or a specific product for an intermediary.

The customer and real-estate information is currently available in the customer profile and suffices for mortgage advice purposes. Tax and social system details, as well as knowledge on composing the calculations for long-term effects are not present at the moment and should be acquired hiring expertise on this field.

When the functionality is built-in, the product definitions and interest rates must be maintained by the Finture operators, ensuring the information is correct and up to date.

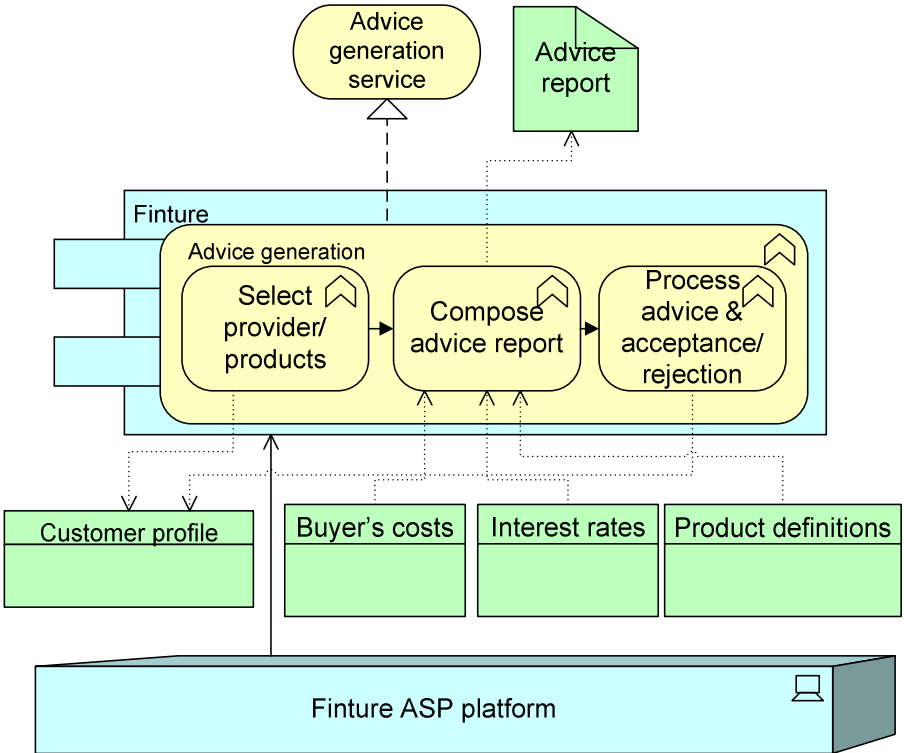


Figure 40 - Mortgage Advice alt. 1 - Including all logic and data-sources in Finture

The user interface of Finture currently facilitates screens to specify the products (composition of mortgage-parts) in a proposition. These interface components could be used to specify the products proposed in an advice by the intermediary employee. The result can be an automatically generated PDF including all tables and graphs representing the financial situation during the lifetime of the mortgage. Figure 40 depicts the technical composition of

this alternative. All steps in the advice phase of the process (see Figure 17) are completed using Finture. Based on the profiles and product (-parts) selected in the proposition an advice report is generated by Finture, without using external systems or services.

The Finture operators (employees of the Finture joint venture) are responsible for keeping the data sources and calculations up to date. There is no standard on communicating product definitions or interest rates at the moment. Concerning the product definitions, it is not likely that there will be such a standard, since there is no standard on definition and representation of mortgage products themselves. Providers notify 'their' resellers on updates, which then have to update the products in their portfolio. Concerning the interest rates, using information brokers aggregating different sources might offer standardization advantages.

Requirements & assumptions

This alternative requires all knowledge on the social and tax system, and details on all additional information sources as discussed in section 6.4 to be present within the Topicus or Finture organizations. This is necessary in order to include these systems in the calculations and to monitor (implications of) changes in the fields. Additionally, changes in interest rates and product definitions should be monitored and processed in Finture. This means the Finture data-model should contain structures to store definitions of products for the various providers, with all their different characteristics.

8.3.2. Alternative 2: Logic in Finture, consulting local external data-sources

The second alternative places the logic in Finture and the data-sources externally, on the local ASP platform. The calculations and product definitions are maintained within Finture. In acquiring the interest rates and buyer’s costs for the calculations, third-party sources on the local ASP platform are used.

Third-parties like Intersoftware and ÈFDÉCÉ provide software products that offer and update interest-rate databases (RenteBox [INT07], Nationale Hypotheek databank [EFD07]). Using these sources for acquiring interest rates places the responsibility for keeping the data up-to-date with the third-party. Regarding buyer’s costs there are no current solutions offering these sources. However, the number of variables and the frequency of change of these variables is limited. These characteristics make it likely that this information can be incorporated in an interest rate data-source.

The responsibility for updating the data-sources is shared by Finture and the third-parties offering their content. Whenever the third-party offers an update to the data-source, Finture has to update the local sources. The interest rate products mentioned, offer online synchronization functionality to update automatically.

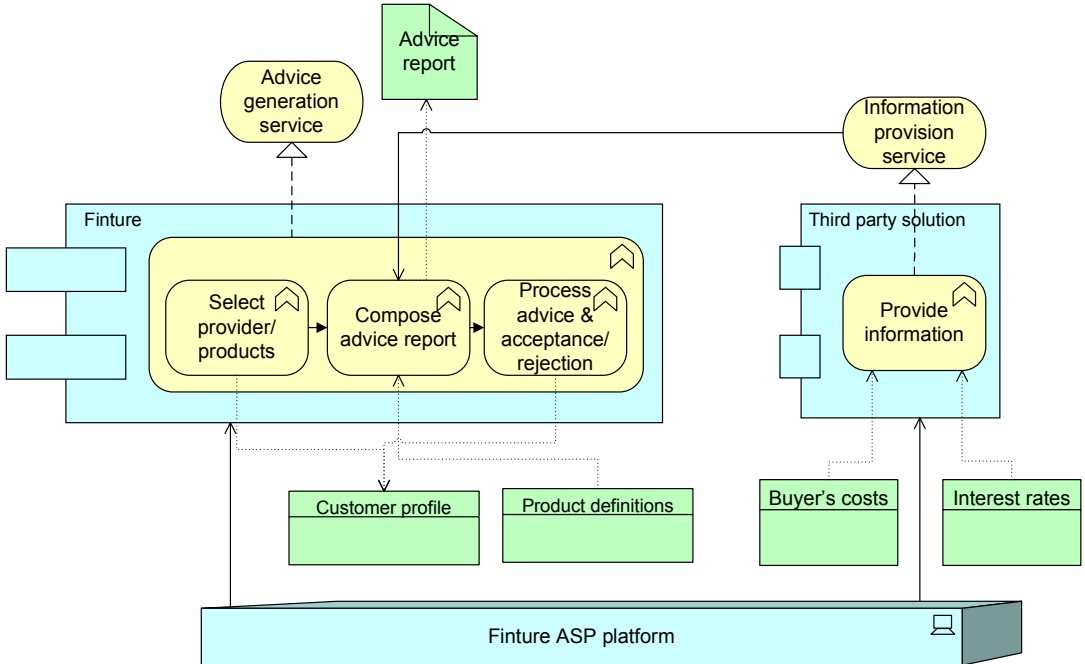


Figure 41 - Mortgage Advice alt. 2 - Logic in Finture, consulting local external data-sources

Requirements & assumptions

In order to invoke a third party data-source on the local platform it is required that these systems do operate on the Finture ASP platform and can be invoked by applications rather than by humans. Regarding buyer’s cost tariffs it is assumed that a third party solution offering interest rates, will also include these details. The “Nationale Hypotheek Databank”

solution of EFDÉCÉ includes tariffs on OZB (real estate tax) [EFD07], this shows that these solutions can be used in storing buyer's costs tariffs.

8.3.3. Alternative 3: Logic in Finture, consulting remote data-sources

The third alternative places the responsibility for conducting the calculations within Finture, but the responsibility for maintenance and availability of the information sources completely external. The result will be an advice report generated by Finture, invoking remote services to acquire accurate interest rates and buyer's cost tariffs.

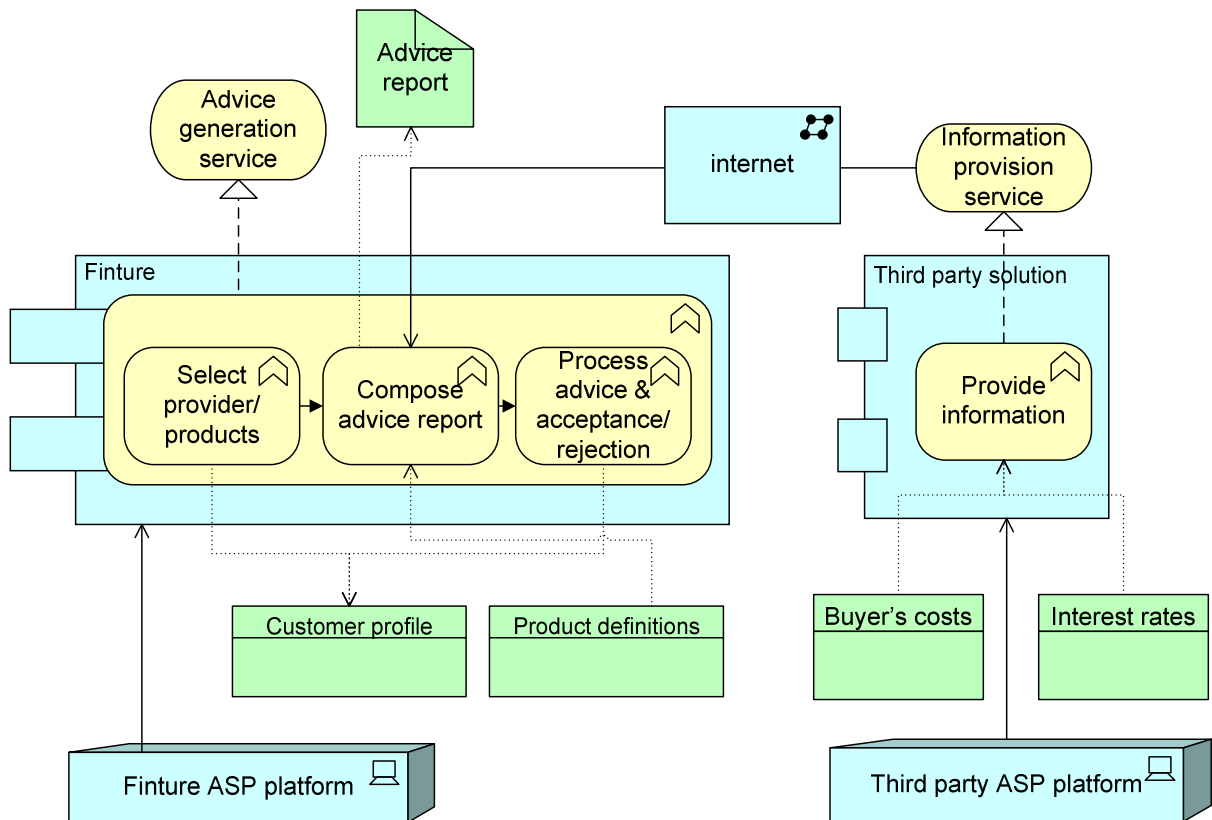


Figure 42 - Mortgage Advice alt. 3 - Logic in Finture, consulting remote data-sources

The information can be exchanged either real-time, upon request during an advice-instance, or by synchronizing periodically. Since the frequency of change of interest rates and buyer's costs differ a lot, the update frequency and technical means in facilitating the interaction could be different. The interest-rates should be updated up to daily, whereas the buyer's costs can be updated with a larger interval. Depending on the third party supplying the information, solutions for the data exchanged have to be agreed upon, since there is no single standard on communicating these results.

Requirements & assumptions

This alternative is only relevant when there is a third party that can provide correct and up to date information. For the interest rates, there are several aggregators maintaining overviews

of interest rates of all mortgage providers and products available, either on websites or in individual applications. Examples are Intersoftware (RenteBox) [INT07] and ÈFDÈCÈ (Nationale Hypotheek Databank) [EFD07] and www.hypotheek-rentetarieven.nl. Question is whether these information sources are currently able of automatically exchanging data with Finture. However, with the current technical standards this should be possible for them to realize at relatively low costs.

8.3.4. Alternative 4: Installing advice software on ASP platform

Opposed to building the logic into Finture, it might be interesting to invoke external software to conduct the calculations. This alternative is comparable to the current situation where intermediaries have licenses for both Finture and third-party advice software. Currently, when initiating the advice report generation activity, the customer profile and real-estate details are exported or copied to the advice software. The intermediary employee then uses this software to generate an advice report and ultimately sends the composed advice back to Finture by means of an HDN AX-message. This current situation requires manual actions of the intermediary in synchronizing the systems and specifying proposed mortgage products in the advice software.

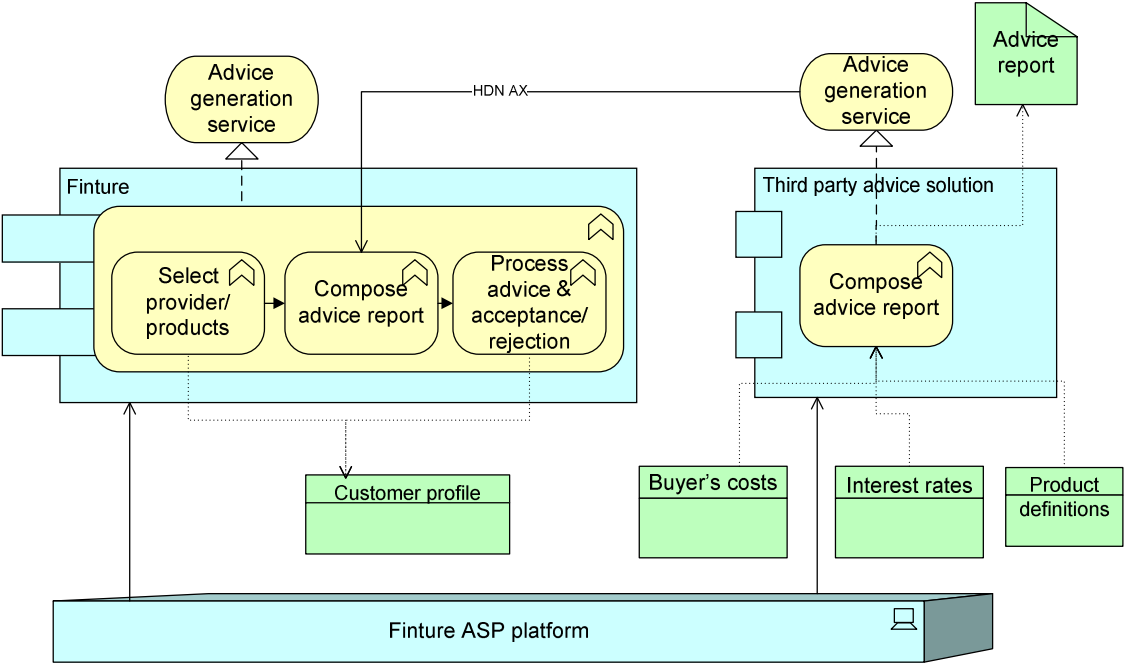


Figure 43 - Mortgage Advice alt. 4 - Installing advice software on ASP platform

Finture is already capable of specifying mortgage-products and mortgage-parts in a proposition. When this information, together with the customer profile and real-estate details, is available, the whole can be exported to the advice system. For this communication the HDN AX message is most appropriate. This standard specifies a structure to communicate details on the customer, the real-estate object and mortgage products (consisting of up to 9 mortgage parts) [HDN06].

Requirements & assumptions

Realizing this alternative is only possible when there is an advice software vendor that wants to co-operate with Topicus/Finture. This vendor should include products of all in Finture available mortgage providers in its "catalogue" so that an advice can be composed for all the in Finture available products.

Interfacing with Finture might require adjustments to the software, or maybe a complete different "black box" version of the product that does not require any manual operation. Manual interaction is hardly possible, since it is installed on the Finture ASP platform. The question is whether a third party is interested in this co-operation, especially when significant changes have to be made in supplying Finture with a black-box version. Topicus has good relations with advice solution vendors ÈFDÉCÉ and Infa, this relation might provide entrances towards this co-operation.

8.3.5. Alternative 5: Invoking web-service advice-software vendor

The fifth alternative is a service oriented approach to the fourth alternative. When an advice software vendor wants to co-operate it might provide a web-service to be invoked by Finture and other (similar) applications. Analogously to the current situation, Finture can export customer profile and real-estate details to the advice service, by means of a pre-defined message. This message will contain data on the customer, the real-estate object involved and a proposed mortgage, again the HDN AX standard seems most appropriate in communicating the customer profiles [HDN06]. The service can respond by returning an advice report by either sending an HDN OX message or by transferring the Advice report by other means.

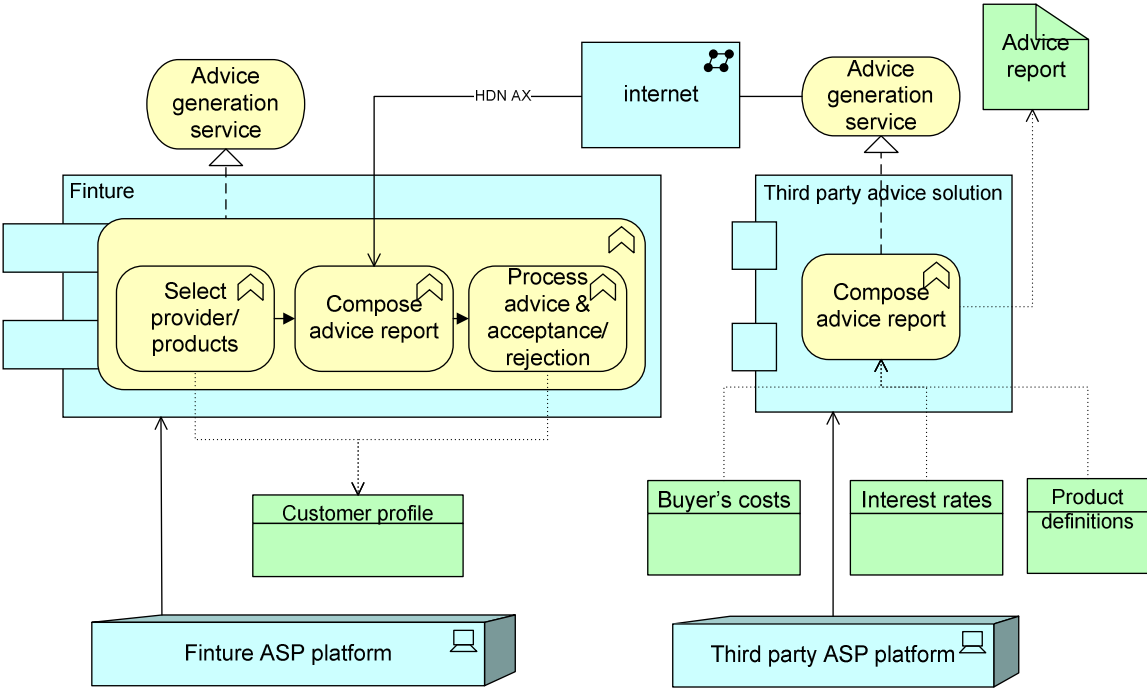


Figure 44 - Mortgage Advice alt. 5 - Invoking web-service advice -software vendor

In this configuration, the responsibility for the advice calculations and maintaining the information sources lies completely with the service provider. Finture’s functionality does not change comparing to the current situation, but it does provide the advice report to the intermediary.

Requirements & assumptions

This alternative requires an external service offering an advice service. It might be interesting for an advice software supplier to provide their content to other actors. In order to provide this, a web-service shell should be developed around their product. For communicating the advice-report a communication standard should be agreed upon.

8.4. Compare and choose

The previous sections discussed five alternatives for incorporating functionality to compose advice reports in Finture. This section will define evaluation criteria for the alternatives and propose a prioritization of the criteria based. This set of criteria forms a comparison framework to assess the five alternatives upon.

8.4.1. Evaluation framework

The criteria to evaluate the design alternatives upon consist of an overall strategic criterion, coming from the corporate strategy of Topicus. Additionally, the requirements (functional and non-functional) identified in the in-depth analysis of the advice process are used in the evaluation.

Regarding the prioritization of the evaluation criteria, the simplicity paradigm of Wiegiers is adopted [WIE99]. Wiegiers states that classification of requirements must be kept as simple as possible. One of the prioritization scales proposed by Wiegiers is the 'high', 'medium', 'low' priority classification, indicating the extent to which a requirement is mission critical [WIE99]. With this classification, the criteria can be relatively weighted and thereby compared. With the small number and abstract characteristics of the criteria proposed, this classification is appropriate according to Wiegiers [WIE99].

Table 7 presents the prioritization of the evaluation criteria based on the high/medium/low classification. The prioritization is mainly derived from the Topicus corporate strategy and the Finture product strategy, in discussion with Topicus consultants.

	Criterion	Priority	Explanation
Strategic criteria			
	Topicus is a software house developing innovative software. The advice functionality should not imply operational or content provision activities for Topicus.	High	Topicus has a clear mission: developing innovative software and service concepts. Operating and maintaining systems does not fit in this mission. Every decision should be derived from this strategy.
Functional criteria			
1	Generated Advice reports should at least contain the same information with at the least the same accuracy and completeness as existing	High	A solution delivering reports of less quality does not add value to the intermediary's process.

	solutions do		
2	All information and knowledge involved in the calculations must be accurately available	High	Accurate information plays a key role in delivering high quality outcomes.
3,5	The user should not have to conduct any manual steps	Medium	In order to maximize the efficiency increase, no manual interaction would be preferred. However, little manual action might be acceptable.
Non-functional criteria			
4	The advice-solution should be available whenever Finture is used	High	The advice process is a crucial step in the intermediary's primary process. When the intermediary offices are open, Finture is available (according to SLA). The Advice functionality should operate under the same SLA.
6	Advice reports must be generated within 30 minutes	Low	The customer must be able to await the generation of the advice report, in order to discuss details with the intermediary employee. A waiting time of 30 minutes is a long time in this generation. However, quality is more important than this time.
7	The definitions of the calculations, product definitions and the other data required must be flexible, so that they can be adapted.	High	All information sources are subject to change, with different frequencies. It is important to implement these changes at low costs.

Table 7 - Prioritization evaluation criteria Mortgage Advice

8.4.2. Evaluating alternatives

The following table presents the evaluation of the five alternatives based on the criteria presented in Table 7. Every alternative is assessed on each alternative resulting in a {-- / - / 0 / + / ++} indication, representing the score on a criterion. The detailed evaluation per alternative can be found in Appendix D. The overall-row presents the overall score of an alternative. This overall score is obtained by adding up the -2/-1/0/1/2 equivalent of the scores in the table. The prioritization is used to introduce a relative weight to the criteria [WIE99]. The low/medium/high importance of a criterion is expressed by a {1/2/3} factor used in the calculation of the overall scores.

Criterion	Priority	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Topicus is a software house developing innovative soft-ware. The advice functionality should not imply operational or content provision activities for Topicus.	High	--	-	-	++	++
Generated Advice reports should at least contain the same information with at the least the same accuracy and completeness as existing solutions do	High	+	+	+	++	++
All information and knowledge involved in the calculations must be accurately available	High	--	+	+	++	++
The user should not have to conduct any manual steps	Med.	+	++	++	++	++
The Advice functionality should be available whenever Finture is used	High	++	+	0	+	+
Advice reports must be generated within 30 minutes	Low	+	+	+	-	+
The definitions of the calculations, product definitions and the other data required must be flexible, so that they can be adapted.	High	+	+	+	+	++
	Overall	3	14	11	27	32

Table 8 - Evaluation alternatives Mortgage Advice

8.4.3. Evaluation conclusion

Incorporating the calculations and complex product definitions in Finture requires extensive domain knowledge and technical resources, during both the initial development and the operational stage. Modifications have to be processed by Topicus developers, violating the Topicus strategy. The violation of the corporate strategy explains the low scores of the first three alternatives. This means the first three alternatives are not very interesting to consider implementing.

Invoking external resources in composing the mortgage advice report does fit the corporate strategy. Content management tasks regarding calculations and product definitions as well as interest rates and buyer's costs are externalized. The quality of the advice produced is likely to be at the level of current advice solutions, since one of the current solutions is assumed to be invoked. This leaves Topicus with its core competence, developing innovative software. This is a main driver in the high scores of alternative 4 and 5. In the fourth alternatives, updates are provided by vendors of the third party solution. These updates can be easily applied on the advice report generating system. The workload of this update activity is assumed to be small and may even be conducted by Finture's operators, employees of the joint venture. In the fifth alternative, even this update responsibility is externalized. By simply invoking the remote service, the whole activity of composing the advice report is supported.

Alternative 4 might be difficult to realize. Question is whether a vendor of advice software is willing to cooperate by supplying an adjusted version of its software. This requires (extensive) activities of the vendor in adjusting its software to be invoked automatically, there might not be a large market justifying this investment.

Regarding alternative 5, somehow the same issues apply as with the fourth option. However, developing a mortgage advice web-service might be commercially more interesting for the vendors. The current mortgage advice products are all desktop based. Developments towards web-based software have not yet been surfacing in the mortgage advice field. The concept of "software as a service" seems very interesting for mortgage advice vendors. They ship off-the-shelf software to many users and have to publish updates regularly. Offering the software as a service reduces workload in shipping software and updates, increasing efficiency for both the vendors and their customers. When a web-based alternative would be available, enabling automated invocation by means of web services becomes very well possible.

The fifth alternative is the best alternative for Topicus and the Finture joint venture, offering a high quality advice without the responsibility of updating the required logic and information. This alternative scores significantly better than the first 3 and has a considerable margin with the fourth option.

At this moment, none of the solution alternatives is directly available. This means that Topicus should either wait until there is an external solution available to cooperate with or develop it internally. In the latter situation, cooperating with an advice vendor in developing a web-service would be most beneficial. The advice vendor has knowledge on the calculations and tax and social systems, and has resources for keeping track of updates on these systems and the other information sources. Topicus can develop the web service interface. This would result in incorporated mortgage advice in Finture, and the possibilities for a web based solution for the advice solution vendor. In this situation, Finture acts as a marketing channel for the advice vendor rather than as a competitor.

This chapter introduced five implementation alternatives to support the mortgage advice sub-process of the mortgage intermediary. The main variables in identifying the alternatives are the position of the logic (life-time calculations) and the position of information required (interest rates, buyer's cost tariffs). By combining the various options, 5 realistic alternative configurations are identified and evaluated. This evaluation showed that there is no directly available solution. Developing the advice functionality in-house, in co-operation with an external advice software vendor seems most beneficial and in line with Topicus corporate strategy.

The next chapter discusses the redesign approach for the Offer Acceptance Check, resulting in an evaluation of solution alternatives. Chapter 10 summarizes the BiZZdesign approach, recommending a combination of solution alternatives for both the Mortgage Advice and Offer Acceptance Check sub-processes.

9. Redesign approach – Offer Acceptance Check

The analysis of the Offer Acceptance Check process showed that testing an offer request against norms before the offer is actually requested at the mortgage provider, could contribute significantly to the service offered by the intermediary. The advices given would be better suitable, since the certainly rejected advices are omitted at forehand, and when an offer is actually requested, the chances of acceptance are better. This section discusses the redesign approach and alternative solutions in realizing this functionality within the Finture boundaries, answering the fifth research question for this sub-process.

9.1. Determining range

9.1.1. Goal redesign project

The main goal of this redesign project is to discover alternative solutions for incorporating functionality to support Offer Acceptance Check in Finture. A generic solution should be available that can be invoked at various moments in the process, presenting an indication whether the prospect qualifies for a specific product. With this support, Finture offers a better service for the intermediary using the system.

9.1.2. Magnitude of change

Incorporating Offer Acceptance checks in Finture does not change the process flow as such. However, it improves the throughput of the process since the number of rejections will be reduced. Therefore this change can be classified as a level 1 change project in terms of BiZZdesign. Process boundaries do not change, but the modifications realize a more efficient process flow with an increased quality of outcomes.

9.1.3. Impact of change

The following table presents the expected impact of the change for the organization as a whole, considering the redesign goal. For each of BiZZdesign’s COPAFIJTH aspects [BRU00], the consequences of incorporating the Offer Acceptance check in Finture are discussed. This table provides an insight of the aspects expected to experience effects of the change project. By evaluating the expected effects, the redesign goal might be adjusted, in order to realize a situation, expected to be better.

Corporate aspect	Element	Specification
Commerce	Competitiveness	Omitting mortgage alternatives that will be rejected at forehand, increases advice service. This might lead to an increased competitive position
	Market position	In best-case scenario market position can improve

		on long term
	Customer relations	No change foreseen
Organization	Structure	No change foreseen
	Culture	No change foreseen
	Flexibility	No change foreseen
Personnel	Characteristics of personnel	Personnel should interpret the norm-check results in order to present a better advice.
	Job profile	No change foreseen
	Job assignment	No change foreseen
Administrative Organization	Process logic	The overall logic does not change. However, an indication of the acceptance check result is available earlier in the process.
	Process structure	No change foreseen
	Task structure	No change foreseen
	Process control	No change foreseen
Finance	Financial position	No change foreseen
	Operational costs	No change foreseen
Information	Information supply	An indication of the conformance to norms is available earlier in the process. This information must be processed in other phases of the process.
	Information requirements	No change foreseen
	Information match	No change foreseen
Legal aspects	Legal dependency	The fact that Finture's Offer Acceptance solution Check indicates good success in checking the norms, does not imply a guaranteed pass. This should be communicated explicitly.
Technology	Technology quality	No change foreseen
	Technological appropriateness	No change foreseen
	Technological flexibility	Developing a generic Acceptance-check component enables invocation at various moments in the process. For instance in the advice process.
Housing	Geography	No change foreseen
	Ergonomics	No change foreseen

Table 9 - Impact of change supporting Offer Acceptance Check with Finture

These expected changes conform to the research goals and form no trigger to adjust the goals set.

9.1.4. Defining range

The range of this project is limited. The aim is to discover alternatives for Offer Acceptance Check functionality within the Finture platform that can be invoked at various moments in the process. The input for the component is known: the customer profile and selected product (-parts). The outcome is an overview indicating whether the customer qualifies for the requested product, and if not, which norms are violated.

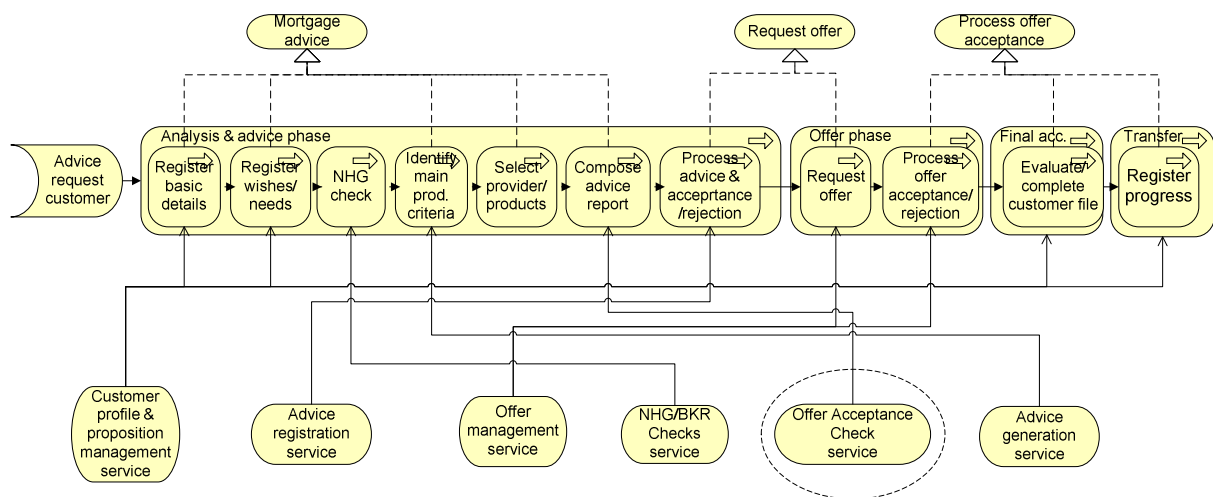


Figure 45 - Range redesign project Offer Acceptance

In positioning this functionality as a distinct application service, as depicted by Figure 45, this service can be invoked at various moments in the process. Most beneficial are invocations from the “Compose advice report” and “Request Offer” business functions.

9.2. Determining essentials

In considering alternatives for incorporation of this check in Finture, the technical conformity check as well as the Code of Conduct check is omitted. The technical conformity applies to the HDN AX message exchanged with the mortgage provider, the internal check is not likely to use this standard since this standard requires a lot of overhead in the communication [HDN06]. All product norms should fall within the norms specified by the general Code of Conduct, therefore this check should be unnecessary. Furthermore, it is not the responsibility of Finture to check whether mortgage providers meet their own Code of Conduct. In identifying alternatives for incorporation of the Offer Acceptance Check in Finture, only the evaluation against provider/product norms is considered.

The Acceptance Check can be seen as an algorithm resulting in either an “accepted”, “rejected” or “subject of debate” indication. The algorithm is a composition of several checks on customer details (variables) with specific allowed bandwidths. The variables that are checked, as well as the valid bandwidths, vary significantly between the different providers. This makes it hardly possible to compose a generic check algorithm with several norm-sheets

for different providers/products. A set-up like with the logic and data-sources in the mortgage advice functionality is therefore out of the picture. For every provider a different algorithm is required, incorporating both the check and variables. Whenever providers update their norms, the algorithms to check against these norms must be updated as well.

The main essential in every design alternative is where to position the check algorithms. Regarding the (responsibility for) maintenance of the norms and non-functional requirements, this positioning is very relevant.

9.3. Design alternatives

For realizing support for the Offer Acceptance Check in Finture, three different alternatives are identified.

1. Conduct acceptance checks internally in Finture, storing all norms explicitly in Finture
2. Conduct acceptance checks internally on local ASP platform, communicate with a third party solution installed on ASP platform
3. Invoke external offer acceptance check service

The following sections will discuss the alternative solutions for the incorporation.

9.3.1. Alternative 1: Conducting acceptance checks internally, norms in Finture

The first alternative is to build all functionality into Finture. The norms of the different providers are all built-in and executed internally.

When an acceptance check is requested, all information on the customer, pawn and requested mortgage (available in customer profile) can be send to the internal *Offer Acceptance Check* component. This component compares the input information with the norms applicable on the specific product, and returns a result indicating whether the request is likely to be accepted, rejected or that further (manual) processing by the provider (or its agent) is required in order to present a final judgment. The message format in communication with the component is not relevant at this stage, since it is an internal invocation. The results of the check can be presented to the intermediary employee by means of the UI, specifying the result per norm. This insight on the check-result per norm enables the employee to determine, based on his expertise, whether or not to actually request an offer at the provider.

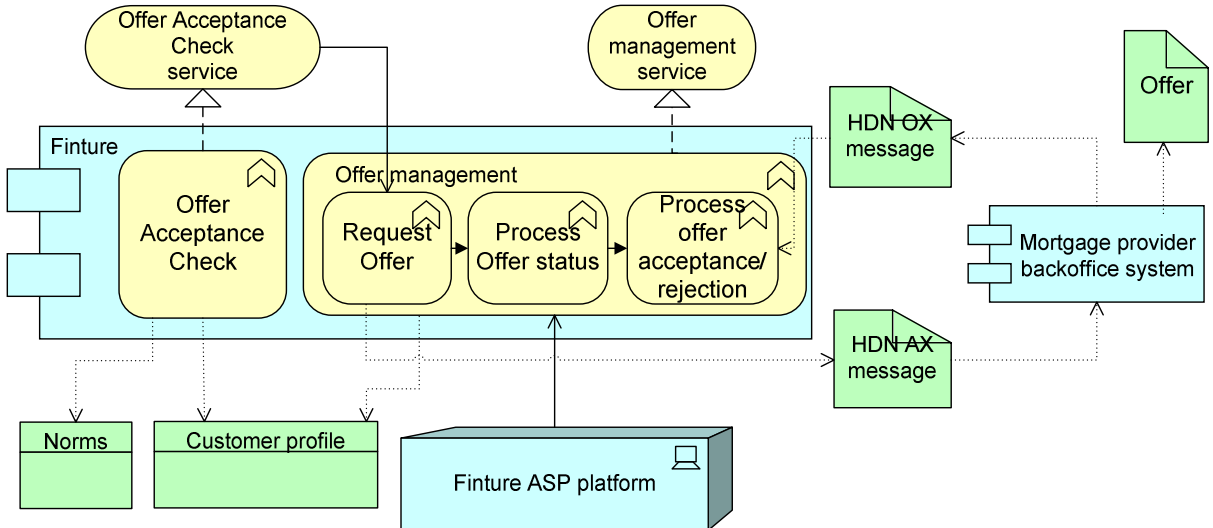


Figure 46 - Offer Acc. alt.1: Conducting Acceptance Check internally

The question is how changes in the norms are communicated. There is no standard on communicating these details. Maintaining changes therefore might imply the manual conversion of the changes in the Finture norm definitions. Although the norms will not change frequently, maintaining the norms is absolutely required, since incorrect norms present false information to the intermediary and its customers, flooring the goals strived for.

Requirements & assumptions

This alternative requires the availability of norm information within Finture. The question is whether providers are willing to provide this information, since this is sensitive information for their competitive position. However, providers already publish their norms to advice-solution vendors as Intersoftware and ÈFDÉCÉ which incorporate it in their own products. This seems

like an indication providers are willing to publish these details, under strict conditions presumably.

When providers are willing to share their norm information, it is doubtful whether these norms can be easily decoded into a generic data structure. All norms apply on somehow the same variables, as discussed in chapter 7, but there is no standard in the definition and representation of the norms. The actual way of representing norms differs considerable between several mortgage providers. This might imply difficulties in completely covering all norms of the different providers and products in full detail. A generic model might not be capable of storing all detailed norms, decreasing the quality and accuracy of the checks. This consideration should be made in evaluating this alternative.

9.3.2. Alternative 2: Invoking external application locally

The second solution is to invoke a black-box providing the check-results. The black boxes contain norm details on individual providers and their products. There are some (mortgage advice) solutions that implement norms using black-boxes. These solutions have .ocx or .dll components included for a large number of mortgage providers and their products. These components encapsulate the norm check-algorithms. By invoking these components on the local platform, Finture is able to present the results of the offer acceptance check to the intermediary. In this scenario the required information must be transformed to the format expected by the black-box. After the check, the outcomes are transformed to a Finture-format to present it to the end-user by means of the user interface.

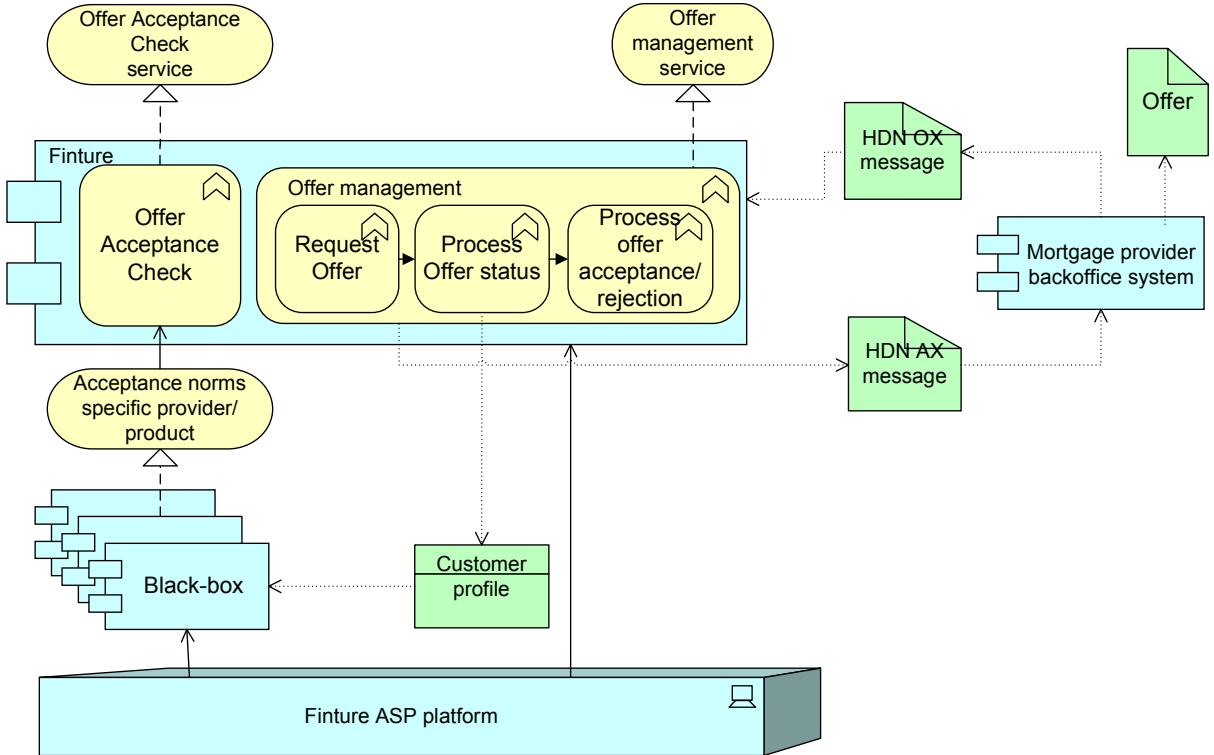


Figure 47 - Offer Acc. alt.2: Conducting acceptance checks internally on local platform

When the norms of products change, providers will send out new versions of their norms to the (mortgage advice solution) vendors offering the black-boxes. These parties can then supply their customers with the newest versions of their components. By updating these boxes, Finture can test against the new norms. In this alternative, updating the black boxes is a fairly easy activity that can be conducted by employees of the Finture joint venture.

Requirements & assumptions

In order to be able to invoke the black-boxes on the Finture ASP platform, it is required to have components that can operate on this platform. Advice-software vendors as Intrasoftware and ÈFDÉCÉ use Windows-based components to check against norms in their advice solutions.

Since Finture operates on the .NET platform, it is assumed that Finture can communicate with these components. Finture must be able to communicate with the black-boxes, This requires information on the technical interface (API) of these components. New versions of the boxes should have the same interface for invocation as the older version. Changes in the interface are likely to cause failure of the service.

9.3.3. Alternative 3: Invoking external acceptance service

The third alternative provides a service oriented approach to the second solution. Instead of invoking local third party solutions, this alternative lets Finture invoke remote services, providing a web-service for acceptance checks.

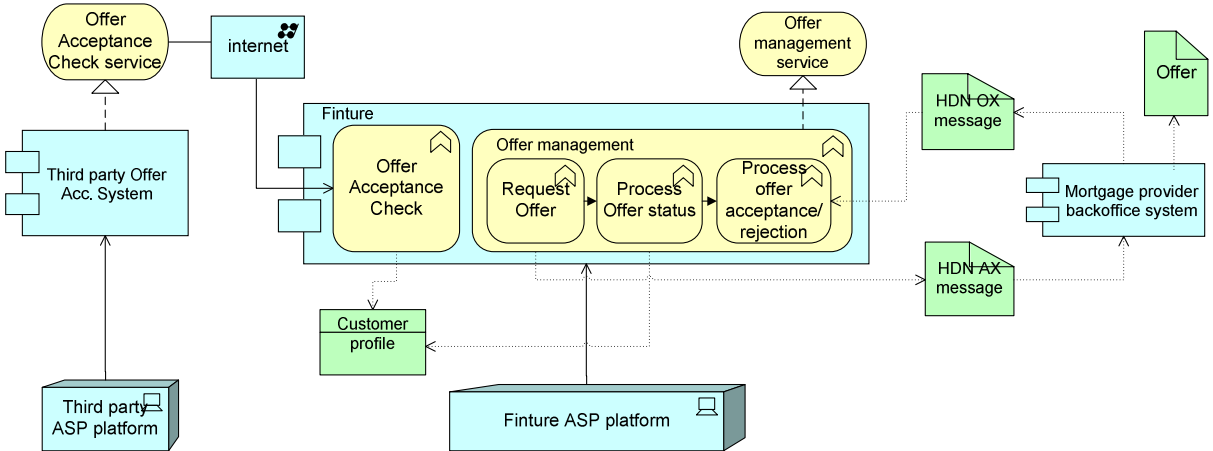


Figure 48 - Offer Acc. alt.3: Invoking external acceptance service

A company with a solution to check against norms might develop a web-service wrapper around this solution to enable remote invocation. In that situation, Finture can send in a 'request for offer message' (using HDN AX), the web-service can transform the message to the required format and apply the norm-check algorithm. The results from the black box need to be transformed to a standard message (for instance HDN SX [HDN07c]) and returned to Finture. Updates on the norms are maintained and processed by the operator of the remote service, Finture always checks against the actual norms of a specific product. For the mortgage providers there is no difference between this situation and the situation where the intermediary manually uses an advice system with built-in norms like HypoBox. Neither Finture nor the intermediary has an insight in the norms itself, only the check results are published and presented.

Requirements & assumptions

Essential in this alternative is that there is an external actor offering checks of all in Finture available providers and products. Service operators like Stater offer Acceptance services to mortgage providers. Norms of for instance Argenta Hypotheken [ARG05] are explicitly formulated for Stater to check by means of automation. Stater might extend this service to

actors like Finture. Since they already have to maintain the norms for their own process and systems, offer this service externally might be realizable against low investments.

9.4. Compare and choose

This section evaluates the three alternatives. First a set of evaluation criteria is defined and prioritized. Subsequently, each alternative is discussed in terms of these criteria.

9.4.1. Prioritization Evaluation criteria

The criteria to evaluate the design alternatives upon consist of overall strategy criteria, coming from the corporate strategy of Topicus. Additionally, the functional and non-functional requirements listed in the in-depth analysis of the advice process are used in the assessment.

	Criterion	Priority	Explanation
Strategic criteria			
	Topicus is a software house developing innovative software. Content provision is explicitly not a competence	High	Topicus has a clear mission: developing innovative software and service concepts. Operating and maintaining systems does not fit in this mission. Every decision should be derived from this strategy.
Functional criteria			
1	The Offer Acceptance Check should check propositions against the specific provider and product norms	High	The quality of the Acceptance Check depends primarily on the quality and accuracy of the norms available. A proposition should always be checked against the right norms.
2	The Offer Acceptance Check must be accessible from multiple phases in the process	Medium	The check must be accessible from the Request Offer activity at least. It would add additional value to be able to invoke the check during Advice generation as well.
3	The check-algorithm may not result in false rejections of offer requests	High	A false rejection means a severe chance of profit missed. A false acceptance will result in additional (manual) work but this is discounted in the interest rates for provided mortgages.
4,5	Norms should be complete and accurate	High	The quality of the Acceptance Check depends primarily on the quality and accuracy of the norms available. A proposition should always be checked

			against accurate norms.
6, 8	The check should be operated with no manual interactions required	Low	Offer the check adds a certain value, when additional manual interaction is required, this is a slight decrease of efficiency but the added value outweighs this drawback.
Non-functional criteria			
7	This component is required to operate at Finture's service level regarding availability	Medium	The Offer Acceptance Check offers additional value to the process, but is not mission critical in case of unavailability. It should be available when Finture is, but unavailability is not a show-stopper.
9	The result should be available within 30 minutes	Low	Although response time is important, quality of the result is more important.
10	The norms must be maintainable by the system's operators rather than Topicus developers	High	Resulting from the Topicus corporate strategy, maintenance of the norms is not a task corresponding with the Topicus mission.

Table 10 - Prioritization evaluation criteria Offer Acceptance Check

9.4.2. Evaluating alternatives

The following table presents the evaluation of the three alternatives based on the criteria presented in Table 10. Every alternative is assessed on each alternative resulting in a {- / - / 0 / + / ++} indication, representing the score on a criterion. The detailed evaluation per alternative can be found in Appendix E. The overall-row presents the overall score of an alternative. This overall score is obtained by adding up the -2/-1/0/1/2 equivalent of the scores in the table. The prioritization is used to introduce a relative weight to the criteria [WIE99]. The low/medium/high importance of a criterion is expressed by a {1/2/3} factor used in the calculation of the overall scores.

Criterion	Priority	Alt 1	Alt 2	Alt 3
Topicus is a software house developing innovative soft-ware. Content provision is explicitly not a competence.	High	--	++	++
The Offer Acceptance Check should check propositions against the specific provider and product norms.	High	++	+	+
The Offer Acceptance Check must be accessible from multiple phases in the process.	Med	++	++	++
The check-algorithm may not result in false rejections	High	-	+	+

of offer requests.				
Norms should be complete and accurate.	High	-	++	++
The check should be operated with no manual interactions required.	Low	++	++	++
This component is required to operate at Finture's service level regarding availability.	Med	++	+	+
The result should be available within 30 minutes.	Low	+	0	0
The norms must be maintainable by the system's operators rather than Topicus developers.	High	--	+	++
	Overall	-1	29	32

Table 11 - Evaluation alternatives Offer Acceptance Check

9.4.3. Evaluation conclusion

Alternative 1 clearly scores worst. This alternative does not conform to the Topicus corporate strategy. Initially defining the different norms in all their complexity for the various providers will cost a lot of developer resources for the Topicus organization. During the operation of the application, when norms change or the product portfolio evolves, additional developer resources are required. This does not fit with the innovative software development strategy of Topicus and is likely to experience delays in implementation leading to inaccurate norms with a loss of quality in the acceptance as a result.

The only condition under which this alternative would be acceptable is when it is possible to define the norms of the different providers in a single data structure, while maintaining the current quality level. When equipped with the right tooling, employees of the Finture joint venture might then be able to manage the norms. However, since this standardization is currently not foreseen, this alternative is no feasible option at this moment.

Alternative 2 scores second, fairly close to the third alternative. This second alternative does fit the Topicus corporate strategy properly. Responsibility for monitoring and implementing updates of the norms is externalized to a third party, providing updates by means of new versions of the black boxes. Performance of these components might be an issue since the black boxes as currently implemented in the advice solutions are not designed for parallel usage. These solutions operate on desktop platforms. Maintenance (replacement activity) of the black boxes on the Finture ASP platform can be conducted by employees of the joint venture.

Alternative 3 scores best in the evaluation framework. This alternative suits the Topicus corporate strategy even better than the second. Besides the responsibility of maintaining the norms, also the responsibility of performance and availability is completely externalized. This requires service level agreements (SLA) with the service operator. The main requirement is

that a third party with norm checking functionality is interested in offering their functionality as a service, most likely besides their current marketing channel. This may be an unrealistic requirement for the near future, since it requires a considerable amount of technical development for a small market potential.

At this moment the second alternative seems best feasible. There are no developments towards an Offer Acceptance Check Service known so far and it is doubtful whether there is enough demand for such a service to be profitable. Using the norm checking black boxes of advice vendors does not require technical resources from the vendors, other than specifying the invocation interface (API). Question is whether the vendors are willing to cooperate by providing their components. With Finture offering a part of their service, the market position of their main solutions might be affected. On the other hand, Finture as-is is not a substitution product for the advice solutions.

This chapter identified and evaluated design alternatives for supporting the Offer Acceptance Check with Finture. Variable component in this analysis was the positioning of the norms to check against. These norms can be positioned on three different positions (internal in Finture, external but on the Finture ASP platform, remote). The alternatives that positions the third-party check components on the local ASP platform showed to be most valuable.

The next chapter summarizes the various sections of this thesis and presents the conclusions and recommendations for supporting the Mortgage Advice and Offer Acceptance Check processes with Finture.

10. Conclusions and Recommendations

The previous chapters analyzed the mortgage chain and the current position of Finture in this chain. Subsequently, sub-processes that could be supported are identified and alternative solutions for realizing this support are discussed and evaluated. This chapter recapitulates the main findings of the different sections of this thesis and presents the conclusions of the analysis as well as recommendations on how to extend Finture's support for the primary process of the intermediary.

10.1. Summary per section

The following sections present the summary for each of the sections of this thesis.

10.1.1. Selecting overall approach from literature

A study of literature on Business Processes showed that Business Process Change is a container term for projects aimed at analyzing business processes with an ultimate goal of improving its structure, execution or support. This 'improved support' aspect is the situation this research aims for, making BP Change a relevant concept. The various Business Process Change approaches discussed in literature can be classified as either radical (BP Reengineering) or incremental (BP improvement). Due to the fundamental and unbiased analysis aspects of the reengineering concept, this Business Process Reengineering (BPR) is best suitable for the analysis of the mortgage chain and Finture's role in it.

Within the field of BPR several approaches exist. Research on these different approaches by Kettinger et al [KET97] led to a Stage-Activity framework providing a phasing for BPR projects. This phasing shows great similarities to the generic lifecycles of business process and information systems, making it very relevant in application for the Finture case. An extension of this framework with organizational levels (strategic/tactical/operational) enables positioning of various activities within BPR projects on the stage and organization level they apply on, this extension is labelled the Stage-Level framework.

As an overall BPR approach the BiZZdesign approach is selected. This approach originates in the Dutch financial sector and is focussed on information intensive, IT-enabled processes. Together with the availability of the accompanying tooling, this approach was most appropriate for application in the Finture case. The concrete means in the analysis are derived by positioning BPR activities, research questions and modelling techniques in the Stage-Level framework.

10.1.2. Understanding mortgage chain & overall process and Finture's current role

In the mortgage chain, intermediaries mediate between mortgage providers and their prospects and customers. A mortgage provider provides mortgages to consumers in order to generate returns on its capital. Intermediaries conduct the front-office tasks of these providers, earning their fees in case the mortgage is provided.

The intermediary's primary process flows from acquisition of prospects to the final transfer of the mortgage sum. This process is labelled the *prospect-phase* of the overall mortgage process.

Finture's functional mission is to provide full support for this primary process, supporting the various activities and interactions with external actors taking place.

At this moment all interactions between the intermediary and the other actors in the prospect-phase of the mortgage process are supported by means of Finture. Regarding the activities taking place, Finture offers support to register details on the customer, the proposition and the status of the proposition.

10.1.3. Identification & selection unsupported processes

All interactions between the intermediary and the other actors involved are supported by Finture. Regarding the activities taking place in the primary process of the intermediary, the identification of the main product criteria and specification of a mortgage configuration is not supported. The subsequent selection of various providers and products suitable for the proposed product configuration, as well as calculating its long-term effects for the financial situation of the customer (resulting in an advice report) are not supported. After the advice is given, an offer for a specific product might be requested. This request is checked against (product-)specific norms, resulting in an indication whether the offer can be provided or not. Finture does not offer support for this offer acceptance. The final acceptance check, concerned with validating the customer's profile after acceptance of an offer is also not supported by Finture.

The final acceptance check cannot be automated since this is a (primarily) manual task, conducted by the mortgage provider or its authorized agent. Calculating the long-term effects and composing the advice report as well as the Offer Acceptance can be automated, there are commercial solutions available.

Combining support for the Offer Acceptance Check with the Mortgage Advice might offer additional benefits for the intermediary. By presenting an indication of the chances of acceptance at forehand the quality of advices presented is likely to increase. The composition

of the Advice report and Offer Acceptance Check are selected for further analysis on opportunities for support by Finture.

10.1.4. In-depth analysis selected processes

The mortgage advice report is instituted by legislation to provide customers with an objective overview of the (consequences of the) alternatives proposed. Customers can then decide upon the alternatives.

In composing the report, details on the products play a key role. Based on the product definition, together with current interest rates and buyer's cost tariffs, the long-term effects can be calculated. Due to a lack of standardization in representing product definitions and calculations, these cannot be treated as distinct resources, which makes exchanging the definitions among actors difficult. The interest rates and buyer's cost tariffs change periodically (interest rates more frequently) and might be acquired remotely. The quality of the advice composed depends primarily on the accuracy of the calculations, product definitions and information sources.

The Offer Acceptance Check acts as a gatekeeper for the Final Acceptance Check. By filtering out the surely rejected offers, this expensive Final Acceptance is likely to perform at a higher conversion rate. In the Offer Acceptance Check the customer profile is tested against the provider or product norms, resulting in a rejection, acceptance or the requirement for further manual processing. The quality of the check depends on the accuracy of the norms tested against.

10.1.5. Identification and recommendation design alternatives

Regarding implementing support for Mortgage advice in Finture the main variable is the positioning of logic and product definitions on the one side and the interest rates and buyer's cost tariffs on the other side. For both the positioning of logic and positioning of information sources, three alternatives are defined. From the 9 possible permutations, 4 combinations are omitted since they are unlikely to occur. This leaves 5 possible alternatives in configuration of the logic and information -source positions. Of these alternative configurations, invoking a remote web-service is the best alternative from the Topicus perspective. Since there is no such service available yet, it is recommended to team-up with an advice-software vendor to develop such a service together.

For the implementation of Offer Acceptance Check, the positioning of the norm checking algorithms is the single most important variable. There are 3 alternative positions, internally in Finture, externally but on the local ASP platform or completely remote. In this evaluation, again the remote alternative is theoretically the best alternative. However, since there is no solution directly available yet and it is questionable whether this will be case in the near future, using third party black box components on the local ASP platform is the best alternative at the moment.

10.2. Conclusion & Recommendations

Application of the BiZZdesign BPR approach proved to be valuable in analyzing the mortgage chain and Finture's current position in this chain. This structured approach, with its emphasis on information intensive process flows, provided a good mean for identification of unsupported processes and the subsequent identification of solution alternatives. The Stage-Level framework proposed in the analysis of Business Process Change activities was of value in identification of the specific means required in the BiZZdesign analysis approach.

Application of the BiZZdesign approach showed that all interactions between intermediaries and their chain partners in the prospect-phase of the mortgage process are currently supported by Finture. There is no value to be gained concerning these interactions. Incorporating support for composing Mortgage Advice reports and the Offer Acceptance Check would significantly increase the added value of Finture for the mortgage intermediaries it serves. With this addition, Finture would be the only application required in completing their primary process. Since the two aforementioned sub-processes require several complex and regularly changing information sources and specific expert-knowledge, building this functionality in Finture conflicts with the Topicus corporate strategy. Fully incorporating the functionality and data-sources in Finture requires content provision and management tasks, which is explicitly formulated as not being a competence of Topicus. These tasks cannot be outsourced completely to the Finture joint venture, since maintenance of the long-term mortgage advice calculations and the norm check algorithms require developer resources. These activities do not conform to the innovative software development mission of Topicus.

For both sub-processes, alternative solutions in incorporating support are identified and evaluated.

The evaluation of the various solution alternatives regarding mortgage advice indicated that there is no directly available solution. There is no third party service that could be invoked instantly, question is whether an advice vendor is willing to co-operate by providing a 'black box' version of their advice solution as such. When Topicus decides that mortgage advice support should be available, it is assumed that this should be developed in-house. Concerning the required information, it is recommended to team up with a mortgage advice solution vendor. These vendors have extensive knowledge on automating the complex calculations and have resources to monitor and maintain changes in tax and social systems, product definitions and the buyer's cost tariffs. Together with such an actor, a solution that can be invoked by Finture can be developed. It is recommended to develop it as a web-service oriented solution.

This service can be invoked remotely by Finture and may be used in the (near) future by the advice vendor to offer a web based solution to the intermediaries it serves. This latter application might be an important consideration for the third party vendor to co-operate.

Regarding the Offer Acceptance Check, the recommended solution alternative is using third party black boxes in checking against norms. Maintenance of the norms is a complex and resource consuming task that should be outsourced from the Topicus perspective. By making use of third party components, the Topicus task is to interact with these components and the task for the Finture joint venture is to make sure the latest version of the check component is available on the Finture ASP platform. The maintenance task lies with the external actor, who presumably already conducts this activity for its own products, like for instance a mortgage advice solution. The Finture application should contain a 'selection wrapper' around the components, invoking the right component when a check request is submitted for a certain proposition. With this situation, the check request can be initiated during various phases of the proposition, like during product selection or when considering requesting a mortgage offer.

The next section depicts the architecture of the recommended situation for both sub-processes. In this recommended situation, the support offered by Finture for the prospect-phase of the primary process of a mortgage intermediary is improved. Thereby, the main research question of this project is answered.

10.3. Architecture recommended situation

The ArchiMate diagram in Figure 49 depicts the recommended situation. This diagram shows that in the recommended situation, Finture is the only application the intermediary employees have to work with in their primary process. The Application services 'Advice generation service' and 'Offer Acceptance Check service' are realized by Finture. The Advice generation service is realized by a Finture component invoking a remote service, whereas the Offer Acceptance Check service is realized by a Finture component using locally hosted third party check components.

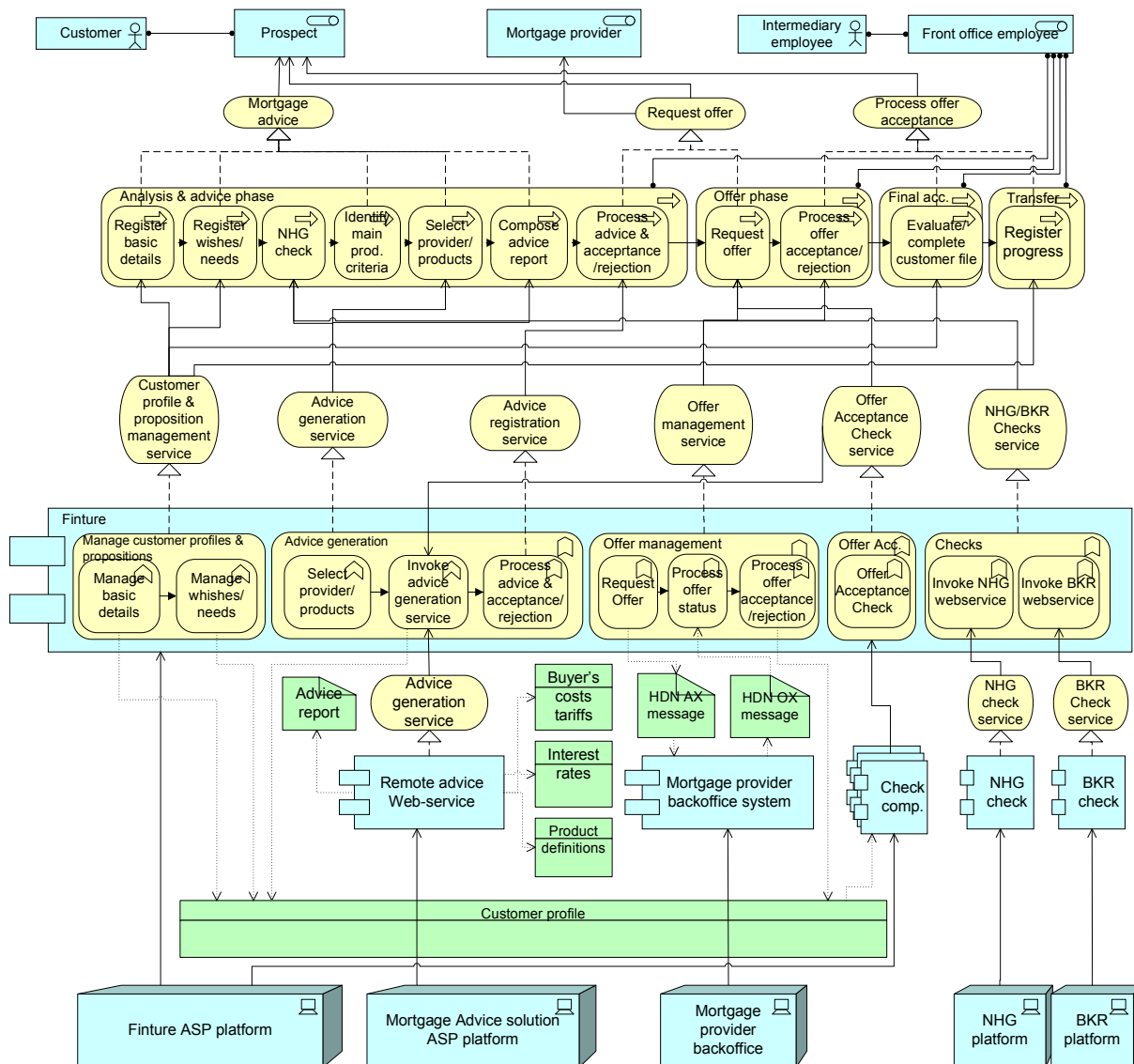


Figure 49- Architecture recommended situation

Extending the functional decomposition as discussed in the Finture documentation [KRA05b], results in the following diagram. In the recommended situation, the Finture components library (FORCE framework) is extended by two primary process components; one for

Mortgage Advice generation and one to check propositions against norms. Extending the underlying FORCE framework with these components enables fast deployment and re-use for other Topicus Finance projects and products [KRA05b].

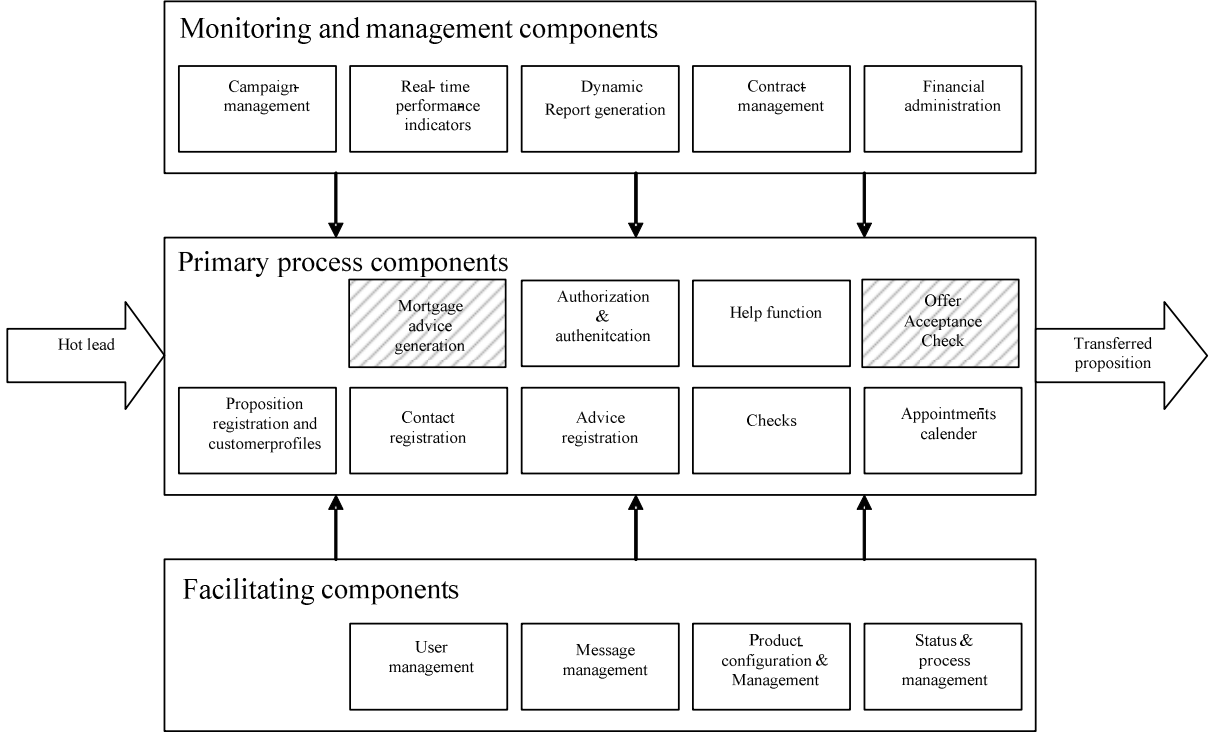


Figure 50 - Functional decomposition recommended situation. Adopted from [KRA05b]

The proposed Mortgage Advice Generation component would connect with the remote Mortgage Advice web-service, providing the customer proposition by means of HDN AX. This advice generation service then composes the advice report and returns this report to the component. The component will then continue by invoking the Advice registration component already available, finalizing the advice, storing the report and eventually processing the customer’s reaction to this advice.

The Offer Acceptance Check component acts as a wrapper around the third-party check components. After identifying the black-box to be used, the customer proposition is transformed to the expected format, the check is conducted and the result is returned to the Offer Acceptance Check component. This component will presumably transform the returned message to a generic Finture format in order to provide the results to the intermediary’s employee or the Advice Generation component triggering the check.

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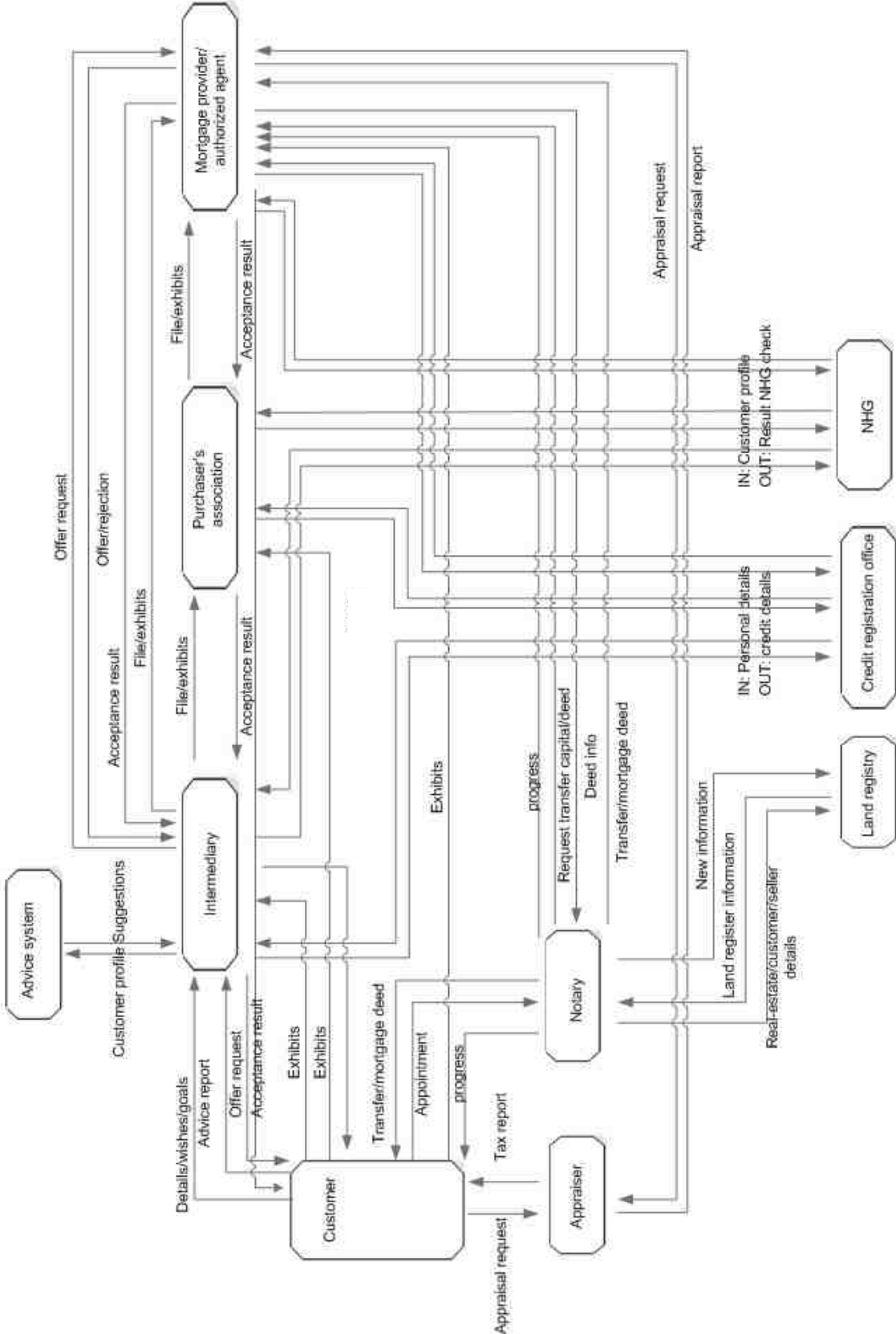
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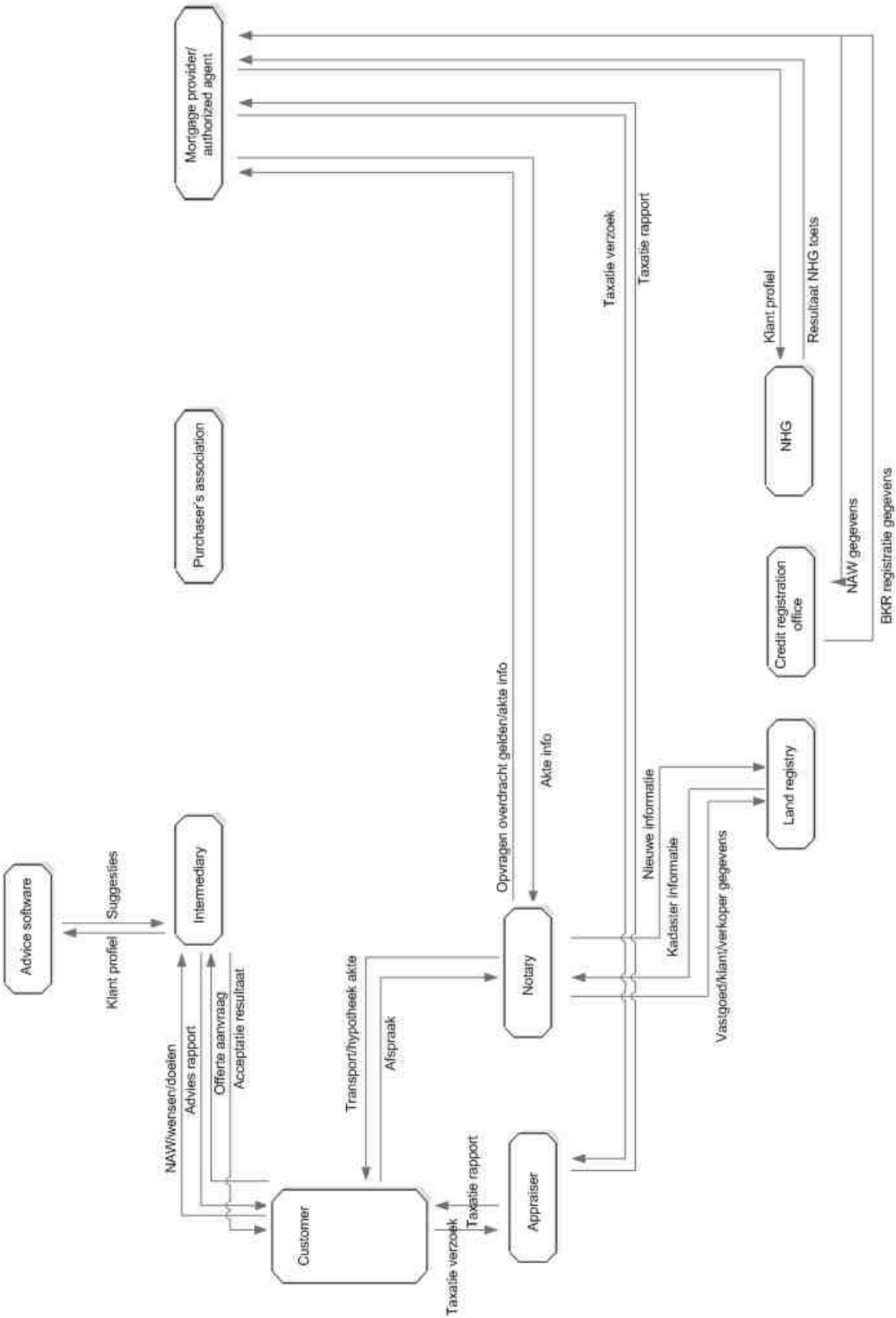
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Appendix A - Detailed context diagram mortgage chain



Appendix C - Detailed Context Diagram mortgage chain ex. Finture



Appendix D - Evaluation alternatives Mortgage Advice

Alternative 1 - Including all functionality and data-sources in Finture

Criterion	Evaluation	
Topicus is a software house developing innovative software. The advice functionality should not imply operational or content provision activities for Topicus.	Including the calculations and product definitions, as well as the interest rates and buyer's cost tariffs in Finture implies maintenance task for the Topicus developers in order to maintain the quality of produced advice. This violates the strategic criterion.	--
Generated Advice reports should at least contain the same information with at the least the same accuracy and completeness as existing solutions do	Since the functionality is developed in-house, it will only be deployed when the quality requirements are met.	+
All information and knowledge involved in the calculations must be accurately available	In this alternative, Finture/Topicus is responsible for maintaining all accuracy of calculations, product definitions and information sources. This requires a lot of tooling and resources.	--
The user should not have to conduct any manual steps	Incorporating all functionality internally enables automatic invocation of the Advice generation functionality.	+
The Advice functionality should be available whenever Finture is used	With the Advice functionality being an integral part of Finture, the performance is alike.	++
Advice reports must be generated within 30 minutes	Since the functionality is developed in-house, it will only be deployed when the performance requirements are met.	+
The definitions of the calculations, product definitions and the other data required must be flexible, so that they can be adapted.	Since the functionality is developed in-house, it will only be deployed when the flexibility requirements are met.	+

Alternative 2 – Logic in Finture, consulting local external data-sources

Criterion	Evaluation	
Topicus is a software house developing innovative software. The advice functionality should not imply operational or content provision activities for Topicus.	Including the calculations and product definitions in Finture implies maintenance task for the Topicus developers in order to maintain the quality of produced advice. Although the most frequently changing sources are externalized, still there is a periodical update required. This violates the strategic criterion.	-
Generated Advice reports should at least contain the same information with at the least the same accuracy and completeness as existing solutions do	Since the advice report generation functionality is developed in-house, it will only be deployed when the quality requirements are met.	+
All information and knowledge involved in the calculations must be accurately available	Externalizing the most frequently changing information sources reduces workload in maintenance. However, maintaining the calculations and product definition still requires resources and tooling.	+
The user should not have to conduct any manual steps	Incorporating calculation internally enables automatic invocation, data sources are likely to be invoked	++

	automatically.	
The Advice functionality should be available whenever Finture is used	With the Advice functionality being an integral part of Finture, the performance is alike. Availability of the external data-sources is not considered a threat since it is a relatively simple application operating on the Finture ASP platform	+
Advice reports must be generated within 30 minutes	Since the functionality is developed in-house, it will only be deployed when the performance requirements are met.	+
The definitions of the calculations, product definitions and the other data required must be flexible, so that they can be adapted.	Since the functionality is developed in-house, it will only be deployed when the flexibility requirements are met.	+

Alternative 3 – Logic in Finture, consulting remote data-sources

Criterion	Evaluation	
Topicus is a software house developing innovative software. The advice functionality should not imply operational or content provision activities for Topicus.	Including the calculations and product definitions in Finture implies maintenance task for the Topicus developers in order to maintain the quality of produced advice. Although the most frequently changing sources are externalized, still there is a periodical update required. This violates the strategic criterion.	-
Generated Advice reports should at least contain the same information with at the least the same accuracy and completeness as existing solutions do	Since the advice report generation functionality is developed in-house, it will only be deployed when the quality requirements are met.	+
All information and knowledge involved in the calculations must be accurately available	Externalizing the most frequently changing information sources reduces workload in maintenance. However, maintaining the calculations and product definition still requires resources and tooling.	+
The user should not have to conduct any manual steps	Incorporating calculation internally enables automatic invocation, data sources are likely to be invoked automatically.	++
The Advice functionality should be available whenever Finture is used	With the Advice functionality being an integral part of Finture, the performance is alike. Availability of the external data-sources is considered a small threat since it is a relatively simple application operating on a remote Finture Asp platform. Agreements on availability of the service should be made upfront	0
Advice reports must be generated within 30 minutes	Since the functionality is developed in-house, it will only be deployed when the performance requirements are met. Response time of the data-source must be largely within this interval. With the simple character of the data exchanged, this is not assumed to be an issue.	+
The definitions of the calculations, product definitions and the other data required must be flexible, so that they can be adapted.	Since the functionality is developed in-house, it will only be deployed when the flexibility requirements are met.	+

Alternative 4 – Installing advice software on ASP platform

Criterion	Evaluation	
Topicus is a software house developing innovative software. The advice functionality should not imply operational or content provision activities for Topicus.	Realizing the advice functionality by invoking an external third party solution fits the strategy of developing software rather than operating and maintaining content.	++
Generated Advice reports should at least contain the same information with at the least the same accuracy and completeness as existing solutions do	A third party application that can be installed locally is likely to be one of the current solutions, probably with adaptation. This means the current quality standards are likely to be met.	++
All information and knowledge involved in the calculations must be accurately available	A third party advice solution is assumed to be accurate and complete regarding calculations and information.	++
The user should not have to conduct any manual steps	The automatic invocation is assumed, otherwise this alternative will not be possible at all (a web-based solution is discussed in alternative 5)	++
The Advice functionality should be available whenever Finture is used	Installing the application on the Finture ASP platform implies that the system is in principle available whenever Finture is. Exceptions may be downtime during updates or failure of the application itself.	+
Advice reports must be generated within 30 minutes	Performance of the third party solution might be an issue, since the current desktop based solutions are not designed for parallel usage. Queuing or parallel processing techniques might be required in providing support for multiple users.	-
The definitions of the calculations, product definitions and the other data required must be flexible, so that they can be adapted.	The responsibility of maintenance of information and calculation is completely externalized. The third parties are currently able to store all the details with all their dynamics, so this is assumed to be not an issue.	+

Alternative 5 – Invoking web-service advice-software vendor

Criterion	Evaluation	
Topicus is a software house developing innovative software. The advice functionality should not imply operational or content provision activities for Topicus.	Realizing the advice functionality by invoking a remote third party solution fits the strategy of developing software rather than operating and maintaining content.	++
Generated Advice reports should at least contain the same information with at the least the same accuracy and completeness as existing solutions do	It seems likely to assume that one of the current advice solution will be used as a basis for a mortgage advice web-service. This means the current quality standards are likely to be met.	++
All information and knowledge involved in the calculations must be accurately available	A third party advice solution is assumed to be accurate and complete regarding calculations and information.	++
The user should not have to conduct any manual steps	The web service concept is designed for automatic interaction. No manual interaction is assumed.	++
The Advice functionality should be available whenever Finture is used	Since the functionality is completely externalized, agreements on the availability should be made upfront.	+

Advice reports must be generated within 30 minutes	A third party offering a mortgage advice web-service is responsible for performance and response time guarantees. Agreements on this have to be made upfront. However, 30 minutes is likely to be a very reasonable response time.	+
The definitions of the calculations, product definitions and the other data required must be flexible, so that they can be adapted.	The responsibility of maintenance of information and calculation is completely externalized. The third parties are currently able to store all the details with all their dynamics, so this is assumed to be not an issue.	++

Appendix E - Evaluation alternatives Offer Acceptance Check

Alternative 1 - Conducting acceptance checks internally, norms in Finture

Criterion	Evaluation	
Topicus is a software house developing innovative software. Content provision is explicitly not a competence.	In this alternative, the norms are stored internally. Updates of the norms require actions of Topicus developers in implementing the new norms. This violates the strategy	--
The Offer Acceptance Check should check propositions against the specific provider and product norms.	Since both the propositions and the norms are available internally, it should be very good possible to match these and select upon the right norms.	++
The Offer Acceptance Check must be accessible from multiple phases in the process.	Since the check is built in internally, invocation from several phases not be an issue	++
The check-algorithm may not result in false rejections of offer requests.	The false rejection rate depends on the quality of the implementation of the norms. The norms of all products should be stored in all their details, question is whether this is feasible for a large number of products	-
Norms should be complete and accurate.	Keeping track of changes of norms implies additional tasks for the Topicus/Finture organization. Subsequent implementation of the changes requires activities of Topicus developers	-
The check should be operated with no manual interactions required.	Since the check is fully built-in, automatic invocation might not be an issue	++
This component is required to operate at Finture's service level regarding availability.	With the check being part of Finture, operating at its service level is implied.	++
The result should be available within 30 minutes.	Performance of the check algorithm is the responsibility of Topicus. It is assumed the checks will only be released when the performance requirements are met.	+
The norms must be maintainable by the system's operators rather than Topicus developers.	Due to the complex nature of the norms, implementing the norms with high accuracy is not possibly by system operators. This requires Topicus developers	--

Alternative 2 - Invoking external application locally

Criterion	Evaluation	
Topicus is a software house developing innovative software. Content provision is explicitly not a competence.	In this alternative Topicus role is completed after developing the interaction with the external components. Operation and maintenance lies with Finture/third party	++
The Offer Acceptance Check should check propositions against the specific provider and product norms.	Finture should contain functionality to select the proper check-component for a specific provider or product. This check is straightforward and not likely to cause difficulties.	+
The Offer Acceptance Check must be accessible from multiple phases in the process.	When the functionality to check a customer proposition against the applicable norms is available, it should be no problem to invoke this check whenever the required information is available.	++
The check-algorithm may not result in false rejections of offer requests.	The false rejection rate depends on the quality of the implementation of the norms. This implementation is the responsibility of a third party and assumed to be good.	++

Norms should be complete and accurate.	Maintenance of the norms is the responsibility of a third party and assumed to result in complete and accurate norms.	++
The check should be operated with no manual interactions required.	The check components are .dll or .ocx components, which are meant to be invoked by external applications without interaction	++
This component is required to operate at Finture's service level regarding availability.	Since the third party black-boxes operate at the Finture ASP platform, their availability is assumed to be equal to Finture's.	+
The result should be available within 30 minutes.	The response time of the check depends primarily on the availability and response time of the third party components.	0
The norms must be maintainable by the system's operators rather than Topicus developers.	Updates on the norms result in updates of the black-boxes. Assuming that the API remains unchanged, the black-boxes can simply be replaced.	+

Alternative 3 - Invoking external acceptance service

Criterion	Evaluation	
Topicus is a software house developing innovative software. Content provision is explicitly not a competence.	In this alternative Topicus role is completed after developing the interaction with the remote service. Operation and maintenance lies with the third party.	++
The Offer Acceptance Check should check propositions against the specific provider and product norms.	Finture exchanges a customer proposition by means of HDN AX. The remote service will identify the provider/product and applies the appropriate norms.	+
The Offer Acceptance Check must be accessible from multiple phases in the process.	When the functionality to check a customer proposition against the applicable norms is available, it should be no problem to invoke this check whenever the required information is available.	++
The check-algorithm may not result in false rejections of offer requests.	The false rejection rate depends on the quality of the implementation of the norms. This implementation is the responsibility of a third party and assumed to be good.	+
Norms should be complete and accurate.	Maintenance of the norms is the responsibility of a third party and assumed to result in complete and accurate norms.	++
The check should be operated with no manual interactions required.	A web service itself is designed to be invoked automatically, so there is no technical requirement for direct user involvement.	+
This component is required to operate at Finture's service level regarding availability.	The remote service operates at an external ASP platform. Agreements on availability must be made with the external actor.	+
The result should be available within 30 minutes.	The response time of the check depends primarily on the availability and response time of the third party components.	0
The norms must be maintainable by the system's operators rather than Topicus developers.	Maintenance of the norms is the responsibility of the third party offering the Offer Acceptance Check service. Neither Finture nor Topicus is involved in this maintenance.	++