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ArchiMate Business Model Patterns to e-Healthcare

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Abstract

ArchiMate is a modeling language to visualize various concepts on Enterprise Architecture. There are various modeling methods using ArchiMate to visualize the Business Model Canvas, Balanced Score Cards, and others. We also have proposed several healthcare business modeling approaches by using ArchiMate. In this paper, we propose a pattern language to describe ArchiMate business models. We also clarify the interrelationship among business model patterns using ArchiMate. Moreover, we show applications of the proposed approach for the e-Healthcare domain.

Keywords

 Digital health care   Enterprise architecture   ArchiMate   Service design
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1 Introduction

There were several research studies to create a business model using ArchiMate [1] that models enterprise architecture (EA). However, patterns to create a business model using ArchiMate have not been proposed. Also, ArchiMate provides many elements for visualizing business models and processes, it is difficult to select appropriate visual elements for novice enterprise modeling architects. Although

ArchiMate provides viewpoint models that are useful to view enterprise architecture by using a selective display that is defined by the viewpoints, it is difficult to use in the development stage of business models.

In this paper, we propose a pattern language to describe useful means to develop ArchiMate diagrams to represent business models and processes. The rest of the paper is as follows. Section 2 describes related work. The pattern language is proposed in Sect. 3. Application of the proposed pattern language to the e-Healthcare domain is described in Sect. 4. Discussions are shown in Sect. 5. Section 6 summarizes this paper.

2 Related Work

2.1 Business Models Using ArchiMate

Iacob et al. [2] proposed a mutual conversion method between EA schema and business model. Meertens et al. [3] proposed a method of mapping ArchiMate and BMC (Business Model Canvas) [4] using business model ontology.

Vicente et al. [5] proposed a method to express ITIL (IT Infrastructure Library [6]) in Business Process diagram by ArchiMate using concept mapping. Iacob et al. [7] propose a mutual conversion method between EA schema and business model. Silva et al. [8] propose a method to schematize the operation process of ITIL using the business process of ArchiMate. Caetano et al. [9] proposed a method of synthesizing a federal business model based on ArchiMate, e3value [10], BMC, using a metamodel.

Luo et al. [11] proposed an impact analysis method based on business process evolution in the EA model by ArchiMate. Caetano [12] and colleagues propose an enterprise modeling method that integrates ArchiMate, e3value, and BM using semantic models. Hinkelmann et al. [13] have proposed a method for confirming the consistency of business and IT from a graphical EA model.

Yamamoto [14] proposes a visualizing method using ArchiMate based on actor relationships constituting a business model. Yamamoto [15] proposes a method to graphically model the job theory [16] with ArchiMate. Yamamoto [17] proposes a method of creating a business process of ArchiMate from a sentence describing a business model. Yamamoto et al. [18] proposed a business model review method using Actor relationship matrix. Yamamoto et al. showed applications for e-Healthcare introduced in [19]. Gomes and et al. [20] have proposed a method to guarantee the continuity of business processes by expressing the COBIT [21] process with ArchiMate.

2.2 Pattern Language

Alexander introduced the pattern Language to show typical building blocks on architectures [22]. It inspired the development of the object-oriented software designs such as design patterns [23]. Although Remane and others developed the business model pattern database [24], they did not mention about ArchiMate.

3 A Pattern Language Toward ArchiMate Business Models

In this paper, we first propose a pattern language to describe business models. Then, we define the mapping between language components and elements of ArchiMate. The following components are used to describe key concepts of business models. The constituents of the pattern language are name, context, problem, solution, example diagram, and constraints.

- Name: Identifies the pattern of business model.

- Context: Constituents of the problematic situation. Context constrains problems and solutions of the pattern.

- Problem: Repeatedly occurs within the context. Stakeholders want to resolve the problems by using the pattern.

- Solution: Means to resolves the problem within the context. Key elements of the solution are provided in the form of a table which describes elements and explanations.

- Example diagram: ArchiMate diagram to show the interrelationship among key constituents of the solution.

- Constraint: Conditions to limit the effectiveness to apply the solution.

Now, we show examples of the pattern language as follows. These are Problem analysis (PA) pattern, MBJT (Model-Based Jobs Theory) pattern, ASOMG (Actor Subject Object Means and Goals) pattern, and ARM (Actor Relationship Matrix) pattern.

4 Applications to Describe ArchiMate Business Model Patterns

To investigate the application and effectiveness of the pattern language, we will describe the following four patterns using ArchiMate.

1. (1)

Problem Analysis Pattern

2. (2)

Model-Based Jobs Theory Pattern

3. (3)

ASOMG Pattern

4. (4)

ARM Pattern.

4.1 Problem Analysis Pattern

- Context: Business environment surrounding the problem.

- Problem: The difficult matters that stakeholders struggle to resolve.

- Solution: Defines the constituents of the solution. Key constituents of the pattern are customer, concerns, problem, cause analysis, ideal situation, and solution.

- Mapping to ArchiMate: Table 1 shows the mapping to ArchiMate of the PA pattern.

Table 1

PA pattern mapping to ArchiMate

Pattern elements	ArchiMate elements
Customer	Actor
Concerns	Value
Problem	Driver
Cause analysis	Assessment
Ideal situation	Goal
Solution	Requirements

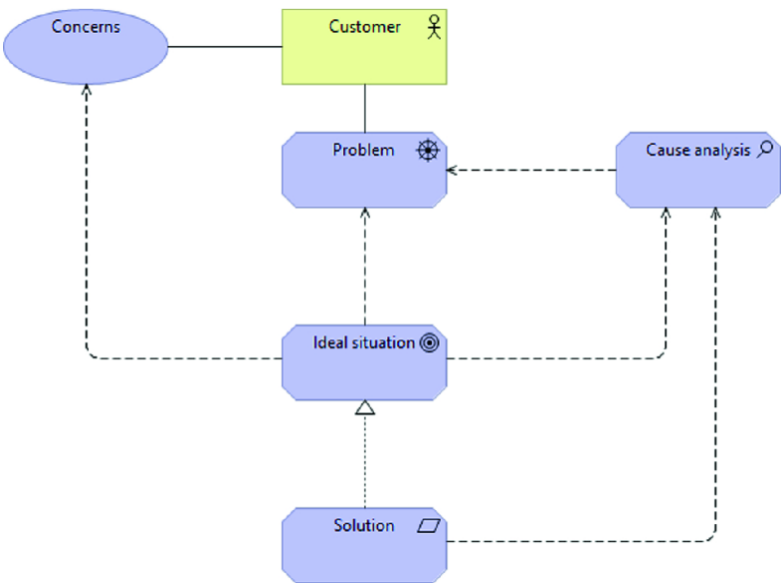- Example diagram: Fig. 1 shows the typical example of PA pattern.

Fig. 1

Problem analysis pattern

- Constraint: Key elements of the PA pattern shall clearly be defined.

4.2 Model-Based Jobs Theory Pattern

- Context: Business environment surrounding the problem.

- Problem: The difficult matters that stakeholders struggle to resolve.

- Solution: Defines the constituents of the solution. Key constituents of the pattern are customer, concerns, problem, cause analysis, ideal situation, and solution.

- Mapping to ArchiMate: Table 2 shows the mapping to ArchiMate of the MBJT pattern.

Table 2

PA pattern mapping to ArchiMate

Elements	Explanations	ArchiMate
Customer	Customer who has a difficult situation	Actor
Job	Process that drives progress which consumers tried to accomplish	Process
Progress	What customers achieve by jobs	Goal
Hire	Use of products by customers to solve jobs	Process
Product	Means customer hire to achieve jobs	Product
Situation	Specific context where jobs occur	Driver
Cause	Reason why situation happen	Assessment
Aspect	Qualities which derive a better solution	Goal
Solution	Means to achieve jobs	Requirement

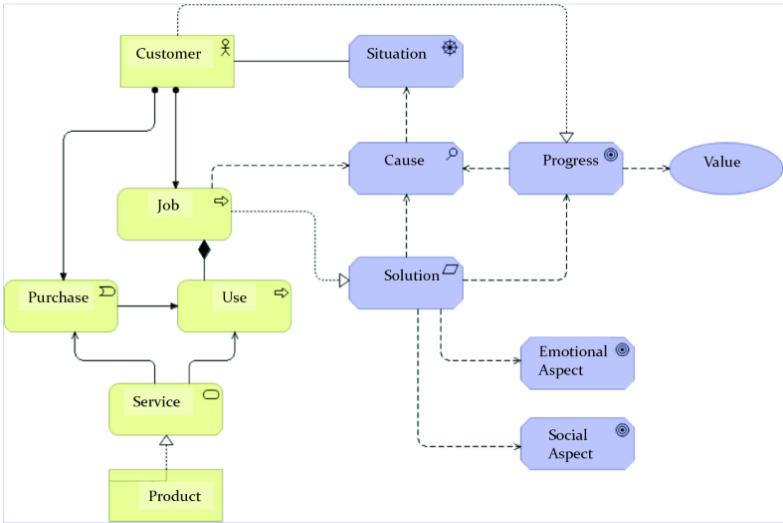- Example diagram: Fig. 2 shows the typical example of MBJT pattern.

Fig. 2

Model-based jobs theory pattern

- Constraint: Key elements of the PA pattern shall clearly be defined. The applicant of the pattern shall study Jobs Theory.

4.3 ASOMG Pattern

- Context: Business case that describes the business problem.

- Problem: The difficult matters that enterprise architects struggle to develop enterprise architecture based on the business case.

- Solution: Defines the constituents of the solution corresponding to ArchiMate elements. Key constituents of the pattern are business actor, business service, business object, business means, and Key Success Factors (KSF).

- Mapping to ArchiMate: Table 3 shows the mapping to ArchiMate of the ASOMG pattern.

Table 3

Mapping from ASOMG to ArchiMate

Pattern elements	ArchiMate elements
Business actor	Business actor
Business service	Business service
Business object	Business object
Business means	Technology elements (Device, node, network)
KSF	Business goal

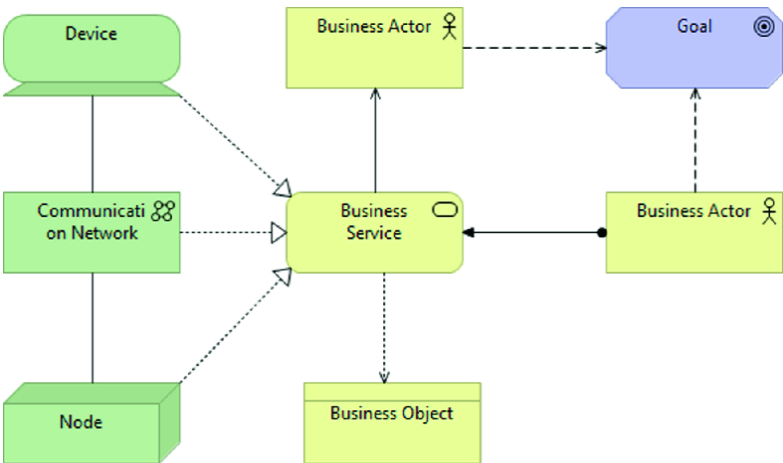- Example diagram: Fig. 3 shows the typical example of ASOMG pattern.

Fig. 3

ASOMG pattern

- Constraint: It is necessary to describe the business case to analyze ASMOG elements. ASOMG elements can be analyzed by using the ASOMG table.

4.4 ARM Pattern

- Context: Business environment surrounding the problem includes multiple actors.

- Problem: The interrelationship among intentions of actors that are exhaustively difficult to clarify.

- Solution: Defines the interrelationship among the actor's intentions by using matrix. Key constituents of the ARM pattern are actors, values, data, actions, and goals. Actions include process and service. Data, Objects, Actions, and Goals are specified for Actors and interrelationship between Actors. ARM is the two-dimensional matrix that defines the intentions of actors as well as the interrelationship between two actors.

- Mapping to ArchiMate: Table 4 shows the mapping to ArchiMate of the ARM pattern.

Table 4

PA pattern mapping to ArchiMate

ARM elements	ArchiMate elements
Actor	Business actor
Data	Business object
Action	Business service/process
Value	Business value
Goal	Business goal

- Example diagram: Fig. 4 shows the typical example of ARM pattern. The payment process is necessary to exchange service for customer and service provider as shown in Fig. 4.
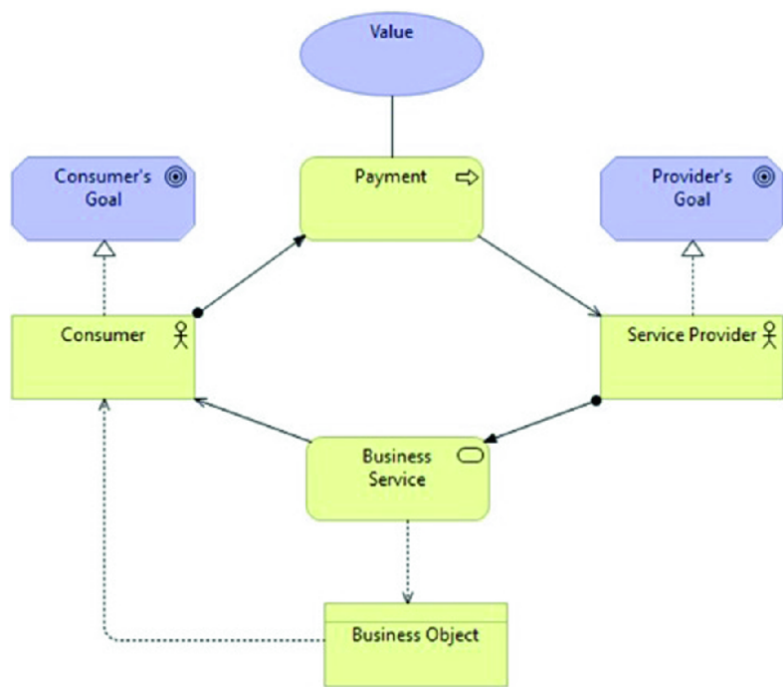
Fig. 4

ARM pattern

- Constraint: ARM shall exhaustively be defined. Otherwise, omissions of intentions may happen.

5 Discussion

5.1 Effectiveness

The pattern language proposed in this paper successfully applied to describe four business model patterns in ArchiMate. This showed the effectiveness of the pattern language. The patterns have also applied to describe e-Healthcare domain business models as shown in [19]. Yamamoto et al. [15, 17, 18] used MBJT, ASOMG, and ARM patterns, respectively. These publications showed the representation capability of the ArchiMate business model patterns. Although these applications are in the e-Healthcare domain, the patterns introduced above are not specific to the e-Healthcare domain. Therefore, these patterns can be applied to other domains.

5.2 Consolidation of Pattern

As the patterns described above contains common elements as shown in Table 5, we can consolidate patterns using common elements. Figure 5 shows an integrated view of patterns through ArchiMate described in this paper. These ArchiMate elements can be interconnected into a consolidated meta-model.

Table 5

Comparison of pattern elements

ArchiMate	PAT	MBJT	ASOMG	ARM
Driver	Problem	Situation	–	–
Cause	–	Assessment	–	–
Business actor	Customer	Customer	Business actor	Actor
Business value	Concerns	–	–	Value
Business object	–	–	Business service	Data
Business service/process	–	Job, hire	Business object	Action
Business goal	Ideal situation	Progress, aspect	KSF	Goal
Requirement	Solution	Solution	–	–
Product	–	Product	–	–
Technology elements (Device, node, network)	–	–	Business means	–
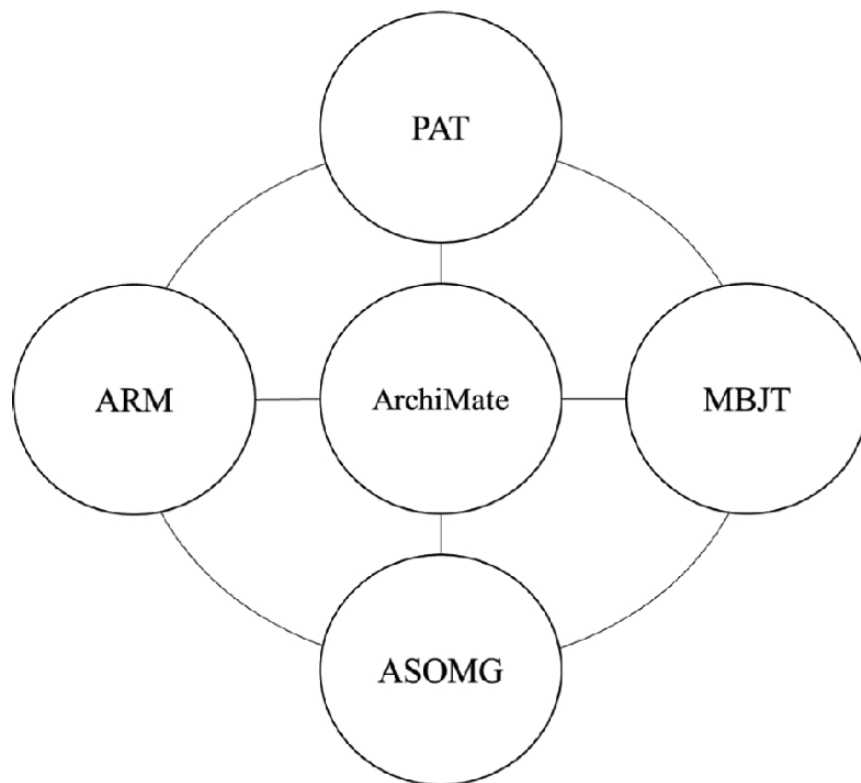
Fig. 5

Integration of patterns through ArchiMate

The figure also inspires possibilities of transformations among patterns.

5.3 Future Issues

Consolidated patterns should be developed to integrate the ArchiMate patterns mentioned in this paper. Moreover, the consolidated ArchiMate can pattern usefully be applied to other e-Healthcare cases.

6 Conclusion

In this paper, we proposed a pattern language for representing business models. Moreover, we verified that the four business models can be described by using the pattern language and the ArchiMate mapping of the patterns can also be constructed. The four patterns have been applied to e-Healthcare digital business models through references [15, 17, 18].

The future research includes the other e-Healthcare applications using the ArchiMate patterns and the consolidated pattern.

References

1. Josey, A., et al.: TOG, ArchiMate® 3.0.1—A Pocket Guide. Van Haren Publishing (2013)
   Google Scholar (https://scholar.google.com/scholar?
   q=Josey%2C%20A.%2C%20et%20al.%3A%20TOG%2C%20ArchiMate%C2%A
   E%203.0.1%E2%80%94A%20Pocket%20Guide.%20Van%20Haren%20Publish
   ing%20%282013%29)

2. Iacob, M.-E., Quartel, D., Jonkers, H.: Capturing business strategy and value in enterprise architecture to support portfolio valuation. In: 2012 IEEE 16th International Enterprise Distributed Object Computing Conference, pp. 11–20 (2012)
   Google Scholar (https://scholar.google.com/scholar?q=Iacob%2C%20M.-
   E.%2C%20Quartel%2C%20D.%2C%20Jonkers%2C%20H.%3A%20Capturing%
   20business%20strategy%20and%20value%20in%20enterprise%20architecture
   %20to%20support%20portfolio%20valuation.%20In%3A%202012%20IEEE%
   2016th%20International%20Enterprise%20Distributed%20Object%20Comput
   ing%20Conference%2C%20pp.%2011%E2%80%9320%20%282012%29)

3. Meertens, L.O., Iacob, M.E., Jonkers, H., Quartel, D.: Mapping the business model canvas to ArchiMate. In: SAC'12, pp. 1694–1701, 25–29 Mar 2012
   Google Scholar (https://scholar.google.com/scholar?
   q=Meertens%2C%20L.O.%2C%20Iacob%2C%20M.E.%2C%20Jonkers%2C%2
   0H.%2C%20Quartel%2C%20D.%3A%20Mapping%20the%20business%20mod
   el%20canvas%20to%20ArchiMate.%20In%3A%20SAC%E2%80%9912%2C%2
   0pp.%201694%E2%80%931701%2C%2025%E2%80%9329%20Mar%202012)

4. Osterwalder, A., Pigneur, Y.: Business Model Generation. Wiley (2010)
   Google Scholar (https://scholar.google.com/scholar?
   q=Osterwalder%2C%20A.%2C%20Pigneur%2C%20Y.%3A%20Business%20M
   odel%20Generation.%20Wiley%20%282010%29)

5. Vicente, M., Gama, N., Mira da Silva, M.: Using ArchiMate to represent ITIL metamodel. In: 2013 IEEE 15th Conference on Business Informatics, pp. 270–275 (2013)
   Google Scholar (https://scholar.google.com/scholar?
   q=Vicente%2C%20M.%2C%20Gama%2C%20N.%2C%20Mira%20da%20Silva
   %2C%20M.%3A%20Using%20ArchiMate%20to%20represent%20ITIL%20met
   amodel.%20In%3A%202013%20IEEE%2015th%20Conference%20on%20Busi
   ness%20Informatics%2C%20pp.%20270%E2%80%93275%20%282013%29)

6. Hanna, A., Windebank, J., Adams, S., Sowerby, J., Rance, S., Cartlidge, A.: ITIL V3 Foundation Handbook. The Stationery Office, Norwich (2008)
   Google Scholar (http://scholar.google.com/scholar_lookup?
   title=ITIL%20V3%20Foundation%20Handbook&author=A.%20Hanna&autho
   r=J.%20Windebank&author=S.%20Adams&author=J.%20Sowerby&author=S.
   %20Rance&author=A.%20Cartlidge&publication_year=2008)

7. Iacob, M.E., Meertens, L.O., Jonkers, H., Quartel, D.A.C., Nieuwenhuis, L.J.M., van Sinderen, M.J.: From enterprise architecture to business models and back. Softw. Syst. Model. **13**(3), 1059–1083 (2014)
   Google Scholar (https://scholar.google.com/scholar?
   q=Iacob%2C%20M.E.%2C%20Meertens%2C%20L.O.%2C%20Jonkers%2C%2
   0H.%2C%20Quartel%2C%20D.A.C.%2C%20Nieuwenhuis%2C%20L.J.M.%2C
   %20van%20Sinderen%2C%20M.J.%3A%20From%20enterprise%20architectu

re%20to%20business%20models%20and%20back.%20Softw.%20Syst.%20Mo
del.%2013%283%29%2C%201059%E2%80%931083%20%282014%29)

8.   Silva, N., Mira da Silva, M., Barafort, B., Vicente, M., Sousa, P.: Using
       ArchiMate to model a process assessment framework. In: SAC '15: Proceedings
       of the 30th Annual ACM Symposium on Applied Computing, pp. 1189–1194
       (2015)
       Google Scholar (https://scholar.google.com/scholar?
       q=Silva%2C%20N.%2C%20Mira%20da%20Silva%2C%20M.%2C%20Barafort
       %2C%20B.%2C%20Vicente%2C%20M.%2C%20Sousa%2C%20P.%3A%20Usin
       g%20ArchiMate%20to%20model%20a%20process%20assessment%20framew
       ork.%20In%3A%20SAC%20%E2%80%9915%3A%20Proceedings%20of%20the
       %2030th%20Annual%20ACM%20Symposium%20on%20Applied%20Computi
       ng%2C%20pp.%201189%E2%80%931194%20%282015%29)

9.   Caetano, A., Antunes, G., Bakhshandeh, M., Borbinha, J., Mira da Silva, M.:
       Analysis of federated business models—an application to the business model
       canvas, ArchiMate, and e3value. In: 2015 IEEE 17th Conference on Business
       Informatics, pp. 1–8 (2015)
       Google Scholar (https://scholar.google.com/scholar?
       q=Caetano%2C%20A.%2C%20Antunes%2C%20G.%2C%20Bakhshandeh%2C
       %20M.%2C%20Borbinha%2C%20J.%2C%20Mira%20da%20Silva%2C%20M.
       %3A%20Analysis%20of%20federated%20business%20models%E2%80%94an
       %20application%20to%20the%20business%20model%20canvas%2C%20Archi
       Mate%2C%20and%20e3value.%20In%3A%202015%20IEEE%2017th%20Conf
       erence%20on%20Business%20Informatics%2C%20pp.%201%E2%80%938%2
       0%282015%29)

10.   Gordijn, J., Akkermans, A.: Value-based requirements engineering: exploring
       innovative e-commerce ideas. Requir. Eng. **8**, 114–134 (2003)
       CrossRef (https://doi.org/10.1007/s00766-003-0169-x)
       Google Scholar (http://scholar.google.com/scholar_lookup?title=Value-
       based%20requirements%20engineering%3A%20exploring%20innovative%20e
       -
       commerce%20ideas&author=J.%20Gordijn&author=A.%20Akkermans&journa
       l=Requir.%20Eng.&volume=8&pages=114-134&publication_year=2003)

11.   Luo, A., Fu, J., Liu, J.: An impact analysis method of business processes
       evolution in enterprise architecture. In: 2016 International Conference on
       Progress in Informatics and Computing (PIC), pp. 733–737 (2016)
       Google Scholar (https://scholar.google.com/scholar?
       q=Luo%2C%20A.%2C%20Fu%2C%20J.%2C%20Liu%2C%20J.%3A%20An%2
       0impact%20analysis%20method%20of%20business%20processes%20evolutio
       n%20in%20enterprise%20architecture.%20In%3A%202016%20International
       %20Conference%20on%20Progress%20in%20Informatics%20and%20Comput
       ing%20%28PIC%29%2C%20pp.%20733%E2%80%93737%20%282016%29)

12.   Caetano, A., Antunes, C., Pombinho, J., Bakhshandeh, M., Granjo, J., Borbinha,
       J., Mira da Silva, M.: Representation and analysis of enterprise models with
       semantic techniques: an application to ArchiMate, e3vakue and business model
       canvas. In: Knowledge Information System. Springer (2016).
        https://doi.org/10.1007/s10115-016-0933-0 (https://doi.org/10.1007/s10115-
       016-0933-0) (https://doi.org/10.1007/s10115-016-0933-0)
       CrossRef (https://doi.org/10.1007/s10115-016-0933-0)

Google Scholar (http://scholar.google.com/scholar_lookup?
title=Representation%20and%20analysis%20of%20enterprise%20models%20
with%20semantic%20techniques%3A%20an%20application%20to%20ArchiM
ate%2C%20e3value%20and%20business%20model%20canvas&author=Artur.
%20Caetano&author=Gon%C3%A7alo.%20Antunes&author=Jo%C3%A3o.%20
Pombinho&author=Marzieh.%20Bakhshandeh&author=Jos%C3%A9.%20Gran
jo&author=Jos%C3%A9.%20Borbinha&author=Miguel%20Mira.%20da%20Sil
va&journal=Knowledge%20and%20Information%20Systems&volume=50&iss
ue=1&pages=315-346&publication_year=2016)

13. Hinkelmann, K., Gerber, A., Karagiannis, D., Thoenssen, B., van der Merwe, A.:
A new paradigm for the continuous alignment of business and IT: combining
enterprise architecture modelling and enterprise ontology. Comput. Ind. **79**,
77–86 (2016)
CrossRef (https://doi.org/10.1016/j.compind.2015.07.009)
Google Scholar (http://scholar.google.com/scholar_lookup?
title=A%20new%20paradigm%20for%20the%20continuous%20alignment%20
of%20business%20and%20IT%3A%20combining%20enterprise%20architectu
re%20modelling%20and%20enterprise%20ontology&author=K.%20Hinkelma
nn&author=A.%20Gerber&author=D.%20Karagiannis&author=B.%20Thoenss
en&author=A.%20Merwe&journal=Comput.%20Ind.&volume=79&pages=77-
86&publication_year=2016)

14. Yamamoto, S.: Actor collaboration matrix for modeling business values in
ArchiMate. In: Proceedings of the Asia Pacific Conference on Information
Management 2016, pp. 369–378. Vietnam National University Press, Hanoi
(2016)
Google Scholar (https://scholar.google.com/scholar?
q=Yamamoto%2C%20S.%3A%20Actor%20collaboration%20matrix%20for%2
0modeling%20business%20values%20in%20ArchiMate.%20In%3A%20Procee
dings%20of%20the%20Asia%20Pacific%20Conference%20on%20Information
%20Management%202016%2C%20pp.%20369%E2%80%93378.%20Vietnam
%20National%20University%20Press%2C%20Hanoi%20%282016%29)

15. Yamamoto, S., Olayan, N.I., Fujieda, J.: e-Healthcare service design using
model based jobs theory. In: InMed2018, Intelligent Interactive Multimedia
Systems and Services, Proceedings of 2018 Conference, pp. 198–207 (2018)
Google Scholar (http://scholar.google.com/scholar_lookup?title=e-
Healthcare%20Service%20Design%20Using%20Model%20Based%20Jobs%20
Theory&author=Shuichiro.%20Yamamoto&author=Nada%20Ibrahem.%20Ola
yan&author=Junkyo.%20Fujieda&pages=198-207&publication_year=2018)

16. Christensen, C., Hall, R., Dillson, K., Duncan, D.: Competing Against Luck.
HarperCollins Publishers LLC, USA (2016)
Google Scholar (http://scholar.google.com/scholar_lookup?
title=Competing%20Against%20Luck&author=C.%20Christensen&author=R.
%20Hall&author=K.%20Dillson&author=D.%20Duncan&publication_year=20
16)

17. Yamamoto, S., et al.: Using ArchiMate to design e-Health business models. Acta
Sci. Med. Sci. **2**(7), 18–26 (2018)
Google Scholar (http://scholar.google.com/scholar_lookup?
title=Using%20ArchiMate%20to%20design%20e-
Health%20business%20models&author=S.%20Yamamoto&journal=Acta%20S

ci.%20Med.%20Sci.&volume=2&issue=7&pages=18-
26&publication_year=2018)

18. Yamamoto, S., Olayan, N.I., Morisaki, S.: Analyzing e-Health business models
     using actor relationship matrix. Acta Sci. Med. Sci. **3**(3), 105–111 (2019)
     Google Scholar (https://scholar.google.com/scholar?
     q=Yamamoto%2C%20S.%2C%20Olayan%2C%20N.I.%2C%20Morisaki%2C%2
     0S.%3A%20Analyzing%20e-
     Health%20business%20models%20using%20actor%20relationship%20matrix.
     %20Acta%20Sci.%20Med.%20Sci.%203%283%29%2C%20105%E2%80%93111
     %20%282019%29)

19. Schiltz, A., Rouille, P., Zabir, S., Genestier, P., Ishigure, Y., Maeda, Y.: Business
     model analysis of eHealth use cases in Europe and in Japan. J. Int. Soc.
     Telemed. eHealth **1**(1), 30–43 (2013)
     Google Scholar (http://scholar.google.com/scholar_lookup?
     title=Business%20model%20analysis%20of%20eHealth%20use%20cases%20i
     n%20Europe%20and%20in%20Japan&author=A.%20Schiltz&author=P.%20R
     ouille&author=S.%20Zabir&author=P.%20Genestier&author=Y.%20Ishigure&
     author=Y.%20Maeda&journal=J.%20Int.%20Soc.%20Telemed.%20eHealth&v
     olume=1&issue=1&pages=30-43&publication_year=2013)

20. Gomes, P., Cadete, G., Mira da Silva, M.: Using enterprise architecture to assist
     business continuity planning in large public organizations. In: 2017 IEEE 19th
     Conference on Business Informatics (CBI), pp. 70–78 (2017)
     Google Scholar (https://scholar.google.com/scholar?
     q=Gomes%2C%20P.%2C%20Cadete%2C%20G.%2C%20Mira%20da%20Silva
     %2C%20M.%3A%20Using%20enterprise%20architecture%20to%20assist%20
     business%20continuity%20planning%20in%20large%20public%20organizatio
     ns.%20In%3A%202017%20IEEE%2019th%20Conference%20on%20Business
     %20Informatics%20%28CBI%29%2C%20pp.%2070%E2%80%9378%20%282
     017%29)

21. ISACA: COBIT5 Enabling Process (2012)
     Google Scholar (https://scholar.google.com/scholar?
     q=ISACA%3A%20COBIT5%20Enabling%20Process%20%282012%29)

22. Alexander, C., et al.: A Pattern Language, Towns, Buildings, Construction.
     Oxford University Press (1977)
     Google Scholar (https://scholar.google.com/scholar?
     q=Alexander%2C%20C.%2C%20et%20al.%3A%20A%20Pattern%20Language
     %2C%20Towns%2C%20Buildings%2C%20Construction.%20Oxford%20Univer
     sity%20Press%20%281977%29)

23. Gamma, E., Helm, R., Johnson, R., Vlissides, J.: Design Patterns: Elements of
     Reusable Object-Oriented Software. Addison-Wesley (1995)
     Google Scholar (https://scholar.google.com/scholar?
     q=Gamma%2C%20E.%2C%20Helm%2C%20R.%2C%20Johnson%2C%20R.%2
     C%20Vlissides%2C%20J.%3A%20Design%20Patterns%3A%20Elements%20of
     %20Reusable%20Object-Oriented%20Software.%20Addison-
     Wesley%20%281995%29)

24. Remane, G., et al.: The business model pattern database—a tool for systematic
     business model innovation. Int. J. Innov. Manag. **21**(1), 175004-1–61 (2017)
     CrossRef (https://doi.org/10.1142/S1363919617500049)

Google Scholar (http://scholar.google.com/scholar_lookup?
title=THE%20BUSINESS%20MODEL%20PATTERN%20DATABASE%20%E2
%80%94%20A%20TOOL%20FOR%20SYSTEMATIC%20BUSINESS%20MOD
EL%20INNOVATION&author=GERRIT.%20REMANE&author=ANDRE.%20
HANELT&author=JAN%20F..%20TESCH&author=LUTZ%20M..%20KOLBE&
journal=International%20Journal%20of%20Innovation%20Management&volu
me=21&issue=01&pages=1750004&publication_year=2017)

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