Appendixes of "A Systematic Mapping Study on Software Product Line Evolution: from Legacy System Reengineering to Product Line Refactoring"

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1 Introduction

Software product lines (SPLs) are used in industry to develop families of similar software systems. Legacy systems, either highly configurable or with a story of versions and local variations, are potential candidates for reconfiguration as SPLs using reengineering techniques. Existing SPLs can also be restructured using specific refactorings to improve their internal quality. Although many contributions (including industrial experiences) can be found in the literature, we lack a global vision covering the whole life cycle of an evolving product line.

The mentioned study aims to survey existing research on the reengineering of legacy systems into SPLs and the refactoring of existing SPLs in order to identify proven approaches and pending challenges for future research in both subfields. A systematic mapping study was launched to find as much literature as possible, covering the diverse terms involved in the search string (restructuring, refactoring, reengineering, etc. always connected with SPLs) and filtering the papers using relevance criteria. The 74 papers selected were classified with respect to several dimensions: main focus, research and contribution type, academic or industrial validation if included, etc. A classification of the research approaches and their feasibility for use in industry is achieved.

This document collects the list of papers initially found and analyzed. Three groups are detailed: The selected papers (Apendix A), the papers refused because they are not peer-reviewed studies (Apendix B), and the papers refused because they do not cover all the required criteria about the subject of the paper (Apendix C).

Appendix A

Selected Papers

[S1] S. A. Ajila, "Reusing base product features to develop product line architecture," in Information Reuse and Integration, Conf, 2005. IRI -2005 IEEE International Conference on., 2005, pp. 288-293.

[S2] R. L. Akers, I. D. Baxter, M. Mehlich, B. J. Ellis, and K. R. Luecke, "Case study: Re-

engineering C++ component models via automatic program transformation," Information and Software Technology, vol. 49, no. 3, pp. 275-291, 2007.

[S3] V. Alves, F. Calheiros, V. Nepomuceno, A. Menezes, S. Soares, and P. Borba, "FLiP: Managing Software Product Line Extraction and Reaction with Aspects," in Software Product Line Conference, 2008 12th International, 2008, pp. 354-354.

[S4] V. Alves, R. Gheyi, T. Massoni, U. Kulesza, P. Borba, and C. Lucena, "Refactoring product lines," in Generative programming and component engineering - GPCE '06, Proceedings of the 5th international conference on, 2006, p. 201.

[S5] V. Alves, P. M. Jr, L. Cole, P. Borba, and G. Ramalho, "Extracting and Evolving Mobile Games Product Lines," in Software Product lines, Springer verlag, Berlin, 2005.

[S6] J. Bartholdt and D. Becker, "Re-engineering of a hierarchical product line," in Proceedings - 15th International Software Product Line Conference, SPLC 2011, 2011, pp. 232-240.

[S7] J. Bayer, J.-F. Girard, M. Würthner, J.-M. DeBaud, and M. Apel, "Transitioning Legacy Assets to a Product Line Architecture," in Software Engineering — ESEC/FSE '99, 1999, vol. 1687, pp. 446-463.

[S8] C. Berger, H. Rendel, and B. Rumpe, "Measuring the Ability to Form a Product Line from Existing Products," in VAMOS, 2010.

[S9] J. Bosch and P. M. Bosch-Sijtsema, "Introducing agile customer-centered development in a legacy software product line," Software: Practice and Experience, no. April, pp. 871-882, 2011.

[S10] F. Calheiros, P. Borba, S. Soares, and V. Nepomuceno, "Product line variability refactoring tool," in 1st Workshop on Refactoring Tools, Berlin (2007), 2007, pp. 33-34.

[S11] F. Chen, S. Li, H. Yang, C.-H. Wang, and W. Cheng-Chung Chu, "Feature analysis for service-oriented reengineering," in Asia-Pacific Software Engineering Conference, 2005. APSEC '05. 12th, 2005, pp. 201-208.

[S12] C.-C. Chiang and R. Y. Lee, "Developing tools for reverse engineering in a software product-line architecture," in Proceedings of the 2004 IEEE International Conference on Information Reuse and Integration, IRI-2004, 2004, pp. 42-47.

[S13] J. M. Conejero, J. Hernández, and E. Jurado, "Early Analysis of Modularity in Software Product Lines," in 21st Inernational Conference on Software Engineering and Knowledge Engineering, 2009, pp. 721-736.

[S14] M. V. Couto, M. T. Valente, and E. Figueiredo, "Extracting software product lines: A case study using conditional compilation," in Proceedings of the European Conference on Software Maintenance and Reengineering, CSMR, 2011, pp. 191-200.

[S15] M. Critchlow, K. Dodd, J. Chou, and A. V. D. Hoek, "Refactoring product line architectures," in International Workshop on Refactoring: Achievements, Challenges, Effects (REFACE03, 2003.

[S16] A. Dabholkar and A. Gokhale, "Middleware Specialization for Product-Lines Using Feature-Oriented Reverse Engineering," in Seventh International Conference on Information Technology, 2010, 2010, pp. 696-701.

[S17] J.-M. DeBaud and J.-F. Girard, "The Relation Between the Product Line Development Entry Points and Reengineering," in Second International ESPRIT ARES Workshop on Development and Evolution of Software Architectures for Product Families, 1998, pp. 132-139.

[S18] P. Frenzel, R. Koschke, A. P. J. Breu, and K. Angstmann, "Extending the Reflexion Method for Consolidating Software Variants into Product Lines," in Reverse Engineering, 2007. WCRE 2007. 14th Working Conference on, 2007, pp. 160-169.

[S19] D. Ganesan and J. Knodel, "Identifying Domain-Specific Reusable Components from Existing OO Systems to Support Product line Migration," in R2PL 2005—Proceedings of the First International Workshop on Reengineering Towards Product Lines, 2005.

[S20] Y. Ghanam and F. Maurer, "Extreme Product Line Engineering–Refactoring for Variability: A Test-Driven Approach," in Agile Processes in Software Engineering and Extreme Programming, 2010, pp. 43-57.

[S21] R. Gheyi, T. Massoni, and P. Borba, “Algebraic laws for feature models,” Journal of Universal Computer Science, vol. 14, no. 21, pp. 3573-3591, 2008.
[S22] R. Gheyi, T. Massoni, and P. Borba, “Automatically checking feature model refactorings,” Journal of Universal Computer Science, vol. 17, no. 5, pp. 684-711, 2011.
[S23] B. Graaf, S. Weber, and A. V. Deursen, “Migrating Supervisory Control Architectures Using Model Transformations,” in Software Maintenance and Reengineering (CSMR 2006), 10th European Conf., 2006, pp. 151-160.
[S24] C. H. B. Hansen K.M., “Component reengineering workshops: A low-cost approach for assessing specific reengineering costs across product lines,” in Proceedings of the European Conference on Software Maintenance and Reengineering, CSMR, 2004, vol. 8, pp. 154-162.
[S25] W. Heider, R. Froschauer, P. Grünbacher, R. Rabiser, and D. Dhungana, “Simulating evolution in model-based product line engineering,” Information and Software Technology, vol. 52, no. 7, pp. 758-769, Jul. 2010.
[S26] A. Hubaux, P. Heymans, and D. Benavides, “Variability modelling challenges from the trenches of an open source product line re-engineering project,” in Proceedings - 12th International Software Product Line Conference, SPLC 2008, 2008, pp. 55-64.
[S27] A. Hubaux, P. Heymans, and H. Unphon, “Separating variability concerns in a product line re-engineering project,” in Proceedings of the 2008 AOSD workshop on Early aspects EA 08, 2008, pp. 1-8.
[S28] I. John, “Capturing Product Line Information from Legacy User Documentation,” in Software Product Lines, Springer, 2006, pp. 127-159.
[S29] I. John, “Integrating Legacy Documentation Assets into a Product Line,” in Revised Papers from the 4th International Workshop on Software Product-Family Engineering, 2002, pp. 113-124.
[S30] G. Jun, D. Eryu, and L. Bin, “Feature-oriented re-engineering using product line approach,” in 2nd International Conference on Information Science and Engineering, ICISE2010 - Proceedings, 2010, pp. 255-260.
[S31] K. C. Kang, M. Kim, J. Lee, and B. Kim, “Feature-oriented re-engineering of legacy systems into product line assets–a case study,” in Software Product Lines, 2005, pp. 45–56.
[S32] K. Kim, H. Kim, and W. Kim, “Building Software Product Line from the Legacy Systems ‘Experience in the Digital Audio and Video Domain’,” in Software Product Line Conference, 2007. SPLC 2007. 11th International, 2007, pp. 171-180.
[S33] J. Knodel and D. Muthig, “Analyzing the Product Line Adequacy of Existing Components,” in R2PL 2005—Proceedings of the First International Workshop on Reengineering Towards Product Lines, 2005.
[S34] J. Knodel et al., “Asset Recovery and Incorporation into Product Lines,” in Proceedings of the 12th Working Conference on Reverse Engineering, 2005, p. 120.
[S35] R. Kolb, D. Muthig, T. Patzke, and K. Yamauchi, “A Case Study in Refactoring a Legacy Component for Reuse in a Product Line,” in International Conference on Software Maintenance (ICSM’05), 21st IEEE, 2005, pp. 369-378.
[S36] R. Kolb, D. Muthig, T. Patzke, and K. Yamauchi, “Refactoring a legacy component for reuse in a software product line: a case study,” J. Softw. Maint. Evol., vol. 18, no. 2, pp. 109-132, 2006.
[S37] C. Kästner, S. Apel, and D. Batory, “A Case Study Implementing Features Using AspectJ,” in Software Product Line Conference, 2007. SPLC 2007. 11th International, 2007, pp. 223-232.
[S38] C. Kästner, S. Apel, and M. Kuhlemann, “A model of refactoring physically and virtually separated features,” in GPCE’09 - Proceedings of the 8th International ACM SIGPLAN Conference on Generative Programming and Component Engineering, 2009, pp. 157-166.
[S39] C. Kästner, M. Kuhlemann, and D. S. Batory, “Automatic FeatureOriented refactoring of legacy applications,” in Workshop on Refactoring Tools, WRT 2007, 2007, pp. 62-63.

[S40] H. Lee, H. Choi, K. Kang, D. Kim, and Z. Lee, “Experience Report on Using a Domain Model-Based Extractive Approach to Software Product Line Asset Development,” in Formal Foundations of Reuse and Domain Engineering (ICSR 2009), 2009, vol. 5791, pp. 137-149.

[S41] J. Liu, D. Batory, and C. Lengauer, “Feature oriented refactoring of legacy applications,” in international conference on Software engineering - ICSE ’06, Proceeding of the 28th, 2006, p. 112.

[S42] F. Loesch and E. Ploedereder, “Optimization of Variability in Software Product Lines,” in Software Product Line Conference, 2007. SPLC 2007. 11th International, 2007, pp. 151-162.

[S43] F. Loesch and E. Ploedereder, “Restructuring Variability in Software Product Lines using Concept Analysis of Product Configurations,” in Software Maintenance and Reengineering, 2007. CSMR ’07. 11th European Conference on, 2007, pp. 159-170.

[S44] R. E. Lopez-Herrejon, L. Montalvillo-Mendizabal, and A. Egyed, “From requirements to features: An exploratory study of feature-oriented refactoring,” in Proceedings - 15th International Software Product Line Conference, SPLC 2011, 2011, pp. 181-190.

[S45] A. Olszak and B. N. Jørgensen, “Remodularizing Java programs for comprehension of features,” in First International Workshop on Feature-Oriented Software Development - FOSD ’09, 2009, p. 19.

[S46] L. O’Brien, F. Hansen, R. Seacord, and D. Smith, “Mining and managing software assets,” in Software Technology and Engineering Practice (STEP’02), 2002, pp. 82-90.

[S47] I. Pashov and M. Riebisch, “Using feature modeling for program comprehension and software architecture recovery,” in 11th IEEE International Conference and Workshop on the Engineering of Computer-Based Systems, 2004, pp. 406-417.

[S48] X. Peng, Y. Yu, and W. Zhao, “Analyzing evolution of variability in a software product line: From contexts and requirements to features,” Information and Software Technology, vol. 53, no. 7, pp. 707-721, Jan. 2011.

[S49] M. Ribeiro and P. Borba, “Recommending refactorings when restructuring variabilities in software product lines,” in Proceedings of the 2nd Workshop on Refactoring Tools, WRT ’08, in conjunction with the Conference on Object Oriented Programming Systems Languages and Applications, OOPSLA, 2008.

[S50] M. Ribeiro and P. Borba, “Improving Guidance when Restructuring Variabilities in Software Product Lines,” in Software Maintenance and Reengineering, 2009. CSMR ’09. 13th European Conference on, 2009, pp. 79-88.

[S51] D. Saraiva, L. Pereira, T. Batista, and F. Delicat, “Architecting a Model-Driven Aspect-Oriented Product Line for a Digital TV Middleware: A Refactoring Experience,” in Software Architecture: 4th European Conference , ECSA 2010,, 2010, pp. 166-181.

[S52] I. Savga and F. Heidenreich, “Refactoring in feature-oriented programming: Open issues,” in Workshop on Modularization, Composition, and Generative Techniques for Product Line Engineering, 2008, pp. 41–46.

[S53] J. Savolainen, I. Oliver, V. Myllärniemi, and T. Männistö, “Analyzing and re-structuring product line dependencies,” in Proceedings - International Computer Software and Applications Conference, 2007, vol. 1, pp. 569-572.

[S54] N. Siegmund, M. Kuhlemann, M. Pukall, and S. Apel, “Optimizing Non-functional Properties of Software Product Lines by means of Refactorings,” in VaMoS’10, 2010, pp. 115-122.

[S55] D. Simon and T. Eisenbarth, “Evolutionary Introduction of Software Product Lines,” in Software Product Lines, 2002, vol. 2379, pp. 1-14.

[S56] D. B. Smith, L. O’Brien, and J. Bergey, “Using the Options Analysis for Reengineering (OAR) Method for Mining Components for a Product Line,” in Software Product Lines, second International Conference on, 2002, pp. 316-327.

[S57] C. Stoermer and L. O’Brien, “MAP - Mining Architectures for Product Line Evaluations,” in IEEE/IFIP Working Conference on Software Architecture, 2001, pp. 35-44.

[S58] R. Stoiber, S. Fricker, M. Jehle, and M. Glinz, “Feature Unweaving: Refactoring

Software Requirements Specifications into Software Product Lines," in 18th IEEE International Requirements Engineering Conference, 2010, pp. 403-404.
[S59] L. P. Tizzei and J. Lee, "An Aspect-oriented View to Support Feature-oriented Reengineering," in Workshop on Aspect-Oriented Modeling (AOM'10) at MODELS, 2010.
[S60] L. P. Tizzei, M. Dias, C. M. F. Rubira, A. Garcia, and J. Lee, "Components meet aspects: Assessing design stability of a software product line," Information and Software Technology, vol. 53, no. 2, pp. 121-136, 2011.
[S61] S. Trujillo, D. Batory, and O. Diaz, "Feature refactoring a multi-representation program into a product line," in Proceedings of the 5th international conference on Generative programming and component engineering, 2006, pp. 191-200.
[S62] N. Weiderman, J. Bergey, D. Smith, and S. Tilley, "Can Legacy Systems Beget Product Lines?," in Second International ESPRIT ARES Workshop, 1998.
[S63] Y. Wu, Y. Yang, X. Peng, C. Qiu, and W. Zhao, "Recovering object-oriented framework for software product line reengineering," in Proceedings of the 12th international conference on Top productivity through software reuse, 2011, pp. 119-134.
[S64] Y. Xue, Z. Xing, and S. Jarzabek, "Understanding feature evolution in a family of product variants," in Working Conference on Reverse Engineering, WCRE, 2010, pp. 109-118.
[S65] Y. Xue, "Reengineering legacy software products into software product line based on automatic variability analysis," in Proceedings of International Conference on Software Engineering, 2011, pp. 1114-1117.
[S66] W. Zhang, S. Jarzabek, N. Loughran, and A. Rashid, "Reengineering a PC-based system into the mobile device product line," in Sixth International Workshop on Principles of Software Evolution, 2003. Proceedings., 2002, pp. 149-160.
[S67] H. P. Breivold, S. Larsson, and R. Land, "Migrating Industrial Systems towards Software Product Lines: Experiences and Observations through Case Studies," 34th Euromicro Conference Software Engineering and Advanced Applications, pp. 232-239, Sep. 2008.
[S69] A. Gruler, M. Leucker, K. Scheidemann, and T. Universit, "Calculating and Modeling Common Parts of Software Product Lines," in 12th International Software Product Line Conference, 2008, pp. 203-212.
[S69] A. Lozano, "An overview of techniques for detecting software variability concepts in source code," in Adavnces in Conceptual Modeling. Recent Developments and new directions, 2011, pp. 141-150.
[S70] M. Pinzger et al., "Architecture recovery for product families," in Software Product-Family Engineering, 2004, pp. 332-351.
[S71] G. Raghavan, "Improving software quality in product families through systematic reengineering," in 7th European Conference on Software Quality, 2002, pp. 90-99.
[S72] K. Romanovsky, D. Koznov, and L. Minchin, "Refactoring the Documentation of Software," in Software Engineering Techniques, 2011, pp. 158-170.
[S73] W. L. Scherlis, "Structural Views, Structural Evolution, and Product Families," in Development and Evolution of Software Architectures for Product Families, 1998, pp. 235-240.
[S74] G. Zhang, L. Shen, X. Peng, Z. Xing, and W. Zhao, "Incremental and Iterative Reengineering towards Software Product Line : An Industrial Case Study," in 2011 International Conference On Software Maintenance, 2011, pp. 418-427.

Appendix B

Refused Papers (type of paper)

[R1] S. Apel, “Proceedings of the First International Work- shop on Feature-Oriented Software Develop- ment (FOSD),” in *New York*, 2009.

[R2] J. K. Bergey and L. M. Northrop…, “Enterprise Framework for the Disciplined Evolution of Legacy Systems,” [RPennsauken, NJ: Auerbach …, 1999.

[R3] J. Bergey, L. O’Brien, and D. Smith, “Options analysis for reengineering (OAR): A method for mining legacy Assets,” CARNEGIE-MELLON UNIV PITTSBURGH PA SOFTWARE ENGINEERING INST, 2001.

[R4] D. Bojic and K. Bothe, “REFMAP: Restructuring by Feature Mapping,” in *Computer as a Tool, 2005. EUROCON 2005.The International Conference on*, 2005, vol. 1, pp. 728-731.

[R5] P. Borba, “An Introduction to Software Product Line Refactoring,” in *GENERATIVE AND TRANSFORMATIONAL TECHNIQUES IN SOFTWARE ENGINEERING III*, 2011, vol. 6491, pp. 1-26.

[R6] J. Conejero, “THE CROSSCUTTING PATTERN: A CONCEPTUAL FRAMEWORK FOR THE ANALYSIS OF MODULARITY ACROSS SOFTWARE DEVELOPMENT PHASES.,” Extremadura, 2010.

[R7] S. Duszynski, “A scalable goal-oriented approach to software variability recovery,” in *ACM International Conference Proceeding Series*, 2011.

[R8] T. Eisenbarth and D. Simon, “Guiding feature asset mining for software product line development,” in *Proceedings of the International Workshop on Product Line Engineering: The Early Steps: Planning, Modeling, and Managing, Erfurt, Germany, Fraunhofer IESE*, 2001, pp. 1–4.

[R9] B. Graaf, L. O’Brien, and R. Capilla, “Reengineering towards Product Lines (R2PL 2005),” in *Reverse Engineering, 12th Working Conference on*, 2005, p. 231.

[R10] I. Ivkovic and K. Kontogiannis, “Mining Existing Software Product Line Artifacts using Polymorphic Dependency Relations,” in *R2PL 2005—Proceedings of the First International Workshop on Reengineering Towards Product Lines*, 2005.

[R11] B. Jurri, S. T. Submitted, I. Technology, and A. Sciences, “Preparing Single Products for Reuse in a Software Product Line Using Compile-time Analysis Techniques,” 2010.

[R12] C. Kästner, S. Apel, and M. Kuhlemann, “A model of refactoring physically and virtually separated features,” *ACM SIGPLAN Notices*, vol. 45, no. 2, pp. 157-166, 2010.

[R13] H. Marcelo López and M. C. Bastarrica, “Business Case for a Product Line of Legacy Application Data-Middleware,” *Citeseer*, pp. 1-6.

[R14] G. C. Murphy, A. Lai, R. J. Walker, and M. P. Robillard, *Separating features in source code: an exploratory study*. IEEE Comput. Soc, 2001, pp. 275-284.

[R15] D. Smith, L. O'Brien, and J. Bergey, "Mining components for a software architecture and a product line: The options analysis for reengineering (OAR) method," in *Proceedings - International Conference on Software Engineering*, 2001, p. 728.

[R16] S. Soares, F. Calheiros, V. Nepomuceno, A. Menezes, P. Borba, and V. Alves, "Supporting software product lines development: FLiP - product line derivation tool," in *Proceedings of the Conference on Object-Oriented Programming Systems, Languages, and Applications, OOPSLA*, 2008, pp. 737-738.

[R17] J.-P. Tolvanen, J. Sprinkle, and J. Gray, "6th OOPSLA Workshop on Domain-Specific Modeling 6th OOPSLA Workshop on Domain-Specific Modeling," *Information Systems*, 2006.

[R18] S. Trujillo, K. Intxausti, and X. Mendialdua, "A Roadmap Toward Model-Driven Feature Refactoring," in *V Taller sobre Desarrollo de Software Dirigido por Modelos (DSDM'08) at Jornadas de Ingenieria del Software y Bases de Datos (JISBD 2008), Gijon, Spain, Sep*, 2008.

[R19] J. Van Gurp and J. Bosch, "software variability management worshop 2003," 2003.

[R20] D. Beuche, "Transforming Legacy Systems into Software Product Lines," 2011 15th International Software Product Line Conference, pp. 361-361, Aug. 2011.

Appendix C

Refused Papers (not SPL oriented evolution)

[R1] D. Batory, "Program refactoring, program synthesis, and model-driven development," in *Compiler Construction*, 2007, no. April, pp. 156–171.

[R2] P. H. S. Bertoncello I.A., Brito, M. O. Dias, and C. M. F. Rubira, "Explicit exception handling variability in component-based product line architectures," in *WEH '08 - Proceedings of the 4th International Workshop on Exception Handling, Co-located with the 16th ACM SIGSOFT International Symposium on the Foundations of Software Engineering*, 2008, pp. 47-54.

[R3] E. de Souza Filho et al., "Evaluating Domain Design Approaches Using Systematic Review," in *Software Architecture*, vol. 5292, R. Morrison, D. Balasubramaniam, and K. Falkner, Eds. Springer Berlin / Heidelberg, 2008, pp. 50-65.

[R4] S. Dersten, J. Fröberg, J. Axelsson, and R. Land, "Analysis of the business effects of software architecture refactoring in an automotive development organization," in *Proceedings - 36th EUROMICRO Conference on Software Engineering and Advanced Applications, SEAA 2010*, 2010, pp. 269-278.

[R5] D. Dhungana, P. Grünbacher, R. Rabiser, and T. Neumayer, "Structuring the modeling space and supporting evolution in software product line engineering," *Journal of Systems and Software*, vol. 83, no. 7, pp. 1108-1122, Jul. 2010.

[R6] D. Dikel, D. Kane, S. Ornburn, and J. Wilson, "Applying Software Architecture," *Computer*, no. August, pp. 49-55, 1997.

[R7] T. Eisenbarth, R. Koschke, and D. Simon, "Locating features in source code," *Software Engineering, IEEE Transactions on*, vol. 29, no. 3, pp. 210-224, 2003.

[R8] T. Eisenbarth, R. Koschke, and D. Simon, "Derivation of feature component maps by means of concept analysis," in *Software Maintenance and Reengineering, 2001. Fifth European Conference on*, 2001.

[R9] M. Eriksson, J. Börstler, and K. Borg, "Managing requirements specifications for product lines – An approach and industry case study," *Journal of Systems and Software*, vol. 82, no. 3, pp. 435-447, Mar. 2009.

[R10] S. Ferber, J. Haag, and J. Savolainen, "Feature Interaction and Dependencies: Modeling Features for Reengineering a Legacy Product Line," in *Software Product Lines*, vol. 2379, G. Chastek, Ed. Springer Berlin / Heidelberg, 2002, pp. 37-60.

[R11] A. Fortier, G. Rossi, S. E. Gordillo, and C. Challiol, "Dealing with variability in context-aware mobile software," *Journal of Systems and Software*, vol. 83, no. 6, pp. 915-936, Jun. 2010.

[R12] B. Graaf, *Model-Driven Evolution of Software Architectures*. IEEE, 2007, pp. 357-360.

[R13] S. Guo, L. Tang, and W. Xu, "XVCL-an annotative approach to feature-oriented programming," in *2010 International Conference on Computational Intelligence and Software Engineering, CiSE 2010*, 2010.

[R14] G. Halmans, K. Pohl, and E. Sikora, "Refactoring-Documenting Application-Specific Adaptations in Software Product Line Engineering," *Lecture Notes in …*, 2008.

[R15] J.Savolainen, I. Oliver, V. Myllärniemi, and T. Männistö, "Analyzing and re-structuring product line dependencies," in *Proceedings - International Computer Software and Applications Conference*, 2007, vol. 1, pp. 569-572.

[R16] I. John and J. Dorr, "Elicitation of requirements from user documentation," in *Proceedings of Ninth International Workshop on Requirements Engineering: Foundation for Software Quality (REFSQ'03)*, 2003, pp. 16–17.

[R17] K. Lee, G. Botterweck, and S. Thiel, "Aspectual Separation of Feature Dependencies for Flexible Feature Composition," in *Computer Software and Applications Conference, 2009. COMPSAC '09. 33rd Annual IEEE International*, 2009, vol. 1, pp. 45-52.

[R18] G. Lewis, E. Morris, and D. Smith, "Service-Oriented Migration and Reuse Technique (SMART)," in *Software Technology and Engineering Practice, 2005. 13th IEEE International Workshop on*, 2005.

[R19] O. Maqbool and H. A. Babri, “Hierarchical Clustering for Software Architecture Recovery,” *Software Engineering, IEEE Transactions on*, vol. 33, no. 11, pp. 759-780, 2007.

[R20] G. C. Murphy, A. Lai, R. J. Walker, and M. P. Robillard, *Separating features in source code: an exploratory study*. IEEE Comput. Soc, 2001, pp. 275-284.

[R21] P. . B. R. O. . Noor M.A.a Grünbacher, “A collaborative approach for product line scoping: A case study in collaboration engineering,” in *Proceedings of the IASTED International Conference on Software Engineering, SE 2007*, 2007, pp. 216-223.

[R22] M. Noor, R. Rabiser, and P. Grunbacher, “Agile product line planning: A collaborative approach and a case study,” *Journal of Systems and Software*, vol. 81, no. 6, pp. 868-882, Jun. 2008.

[R23] L. O’Brien, D. Smith, and G. Lewis, “Supporting migration to services using software architecture reconstruction,” in *Proceedings - 13th IEEE International Workshop on Software Technology and Engineering Practice, STEP 2005*, 2005, vol. 2005, pp. 81-91.

[R24] I. Pashov, M. Riebisch, and I. Philippow, “Supporting architectural restructuring by analyzing feature models,” in *Software Maintenance and Reengineering, 2004. CSMR 2004. Proceedings. Eighth European Conference on*, 2004, pp. 25-34.

[R25] P. Pirkelbauer, D. Dechev, and B. Stroustrup, “Source Code Rejuvenation is not Refactoring,” *SOFSEM 2010: Theory and Practice of Computer Science*, pp. 639–650, 2010.

[R26] H. Remmel, B. Paech, C. Engwer, and P. Bastian, “Supporting the testing of scientific frameworks with software product line engineering - A proposed approach,” in *Proceedings - International Conference on Software Engineering*, 2011, pp. 10-18.

[R27] H. M. Sneed, “Integrating legacy Software into a Service oriented Architecture,” *Conference on Software Maintenance and Reengineering (CSMR’06)*, pp. 3-14, 2006.

[R28] A. Tsakiris, “Managing software interfaces of on-board automotive controllers,” IEEE Software, vol. 28, no. 1, pp. 73-76, 2011.

[R29] T. E. Fægri et al., “Exploring communities of practice for product family engineering,” Lecture Notes in Computer Science, vol. 3782, pp. 96-105, 2005.

[R30] M. Kircher, C. Schwanninger, and I. Groher, “Transitioning to a software product family approach-challenges and best practices,” in Software Product Line Conference, 2008, pp. 171-178.

[R31] A. Maccari and C. Riva, “Architectural evolution of legacy product families,” in 4th International Workshop on Product Family Engineering (PFE-4), 2001, pp. 64-69.

[R32] C. D. Rosso, “The process of and the lessons learned from performance tuning of a product family software architecture for mobile phones,” in Eighth European Conference on Software Maintenance and Reengineering,, 2004, pp. 270 - 275.

[R33] F. Stallinger, R. Neumann, R. Schossleitner, and S. Kriener, “Migrating Towards Evolving Software Product Lines : Challenges of an SME in a Core Customer-driven

Industrial Systems Engineering Context," in 2nd International Workshop on Product Line Approaches in Software Engineering, PLEASE 2011, 2011, pp. 20-24.

[R34] M. T. Valente, V. Borges, and L. Passos, "A Semi-Automatic Approach for Extracting Software Product Lines," IEEE Transactions on Software Engineering, pp. 1-20, 2011.

[R35] X. F. Zha and R. D. Sriram, "Platform-based product design and development: A knowledge-intensive support approach," Knowledge-Based Systems, pp. 524-543, 2006.