Meta-informações das revisões bibliográficas (2018)

Várias dessas informações não podem ser extraídas do artigo e devem ser obtidas via internet.

O artigo de revisão que você irá analisar nem sempre contém informações para todas as meta-informações, além das que você pode encontrar na web. Se ele não contiver, digite NADA no tópico correspondente.

As informações podem ser inseridas em inglês, como cópia do original (citar a página)

Salvar este artigo antes de inserir o conteúdo, com o título: SEP5843 2018 - análise revisão <nome do aluno> <ano, autor principal>

1. Referência completa do artigo

Cavalieri, S., & Pezzotta, G. (2012). Product–Service Systems Engineering: State of the art and research challenges. Computers in industry, 63(4), 278-288.

2. Autores (um registro por autor)

Sergio Cavalieri

2.1. Tipo: Professor
2.2. Idade: 48 anos
2.3. Anos pesquisando no assunto:
Desde 2002 como “After-sales services” (16 anos).
Desde 2009 como “Product-service engineering” (9 anos).
2.4. Instituição: Universitá di Bergamo
2.5. Colegas da mesma instituição
Apenas incluídos colegas do mesmo grupo de pesquisa

- Professores: Roberto Pinto; Paolo Gaiardelli; Stefano Dotti
- Pesquisadores: Giuditta Pezzotta; Fabiana Pirola; Emanuele Dovere; Enrico Cagnoni; Francesca Carrara.
- Estudantes: Chiara Cimini; Roberto Sala; Michela Zambetti; Vittorio Zanetti.

2.6. Quantidade de artigos já publicados: 231 (Google Scholar) – (~30 em journals)
2.7. Outros artigos significativos (mais citados) sobre outros temas

- 445 citações - “Terzi, S., & Cavalieri, S. (2004). Simulation in the supply chain context: a survey. Computers in industry, 53(1), 3-16.”
- 214 citações - “Cavalieri, S., Maccarrone, P., & Pinto, R. (2004). Parametric vs. neural network models for the estimation of production costs: A case study in the automotive industry. International Journal of Production Economics, 91(2), 165-177.”
- 165 citações - “Caridi, M., & Cavalieri, S. (2004). Multi-agent systems in production planning and control: an overview. *Production Planning & Control*, *15*(2), 106-118.”

- 87 citações – “Cavalieri, S., Garetti, M., Macchi, M., & Pinto, R. (2008). A decision-making framework for managing maintenance spare parts. Production planning & control, 19(4), 379-396.”
- 86 citações – “Cavalieri, S., Garetti, M., Macchi, M., & Taisch, M. (2000). An experimental benchmarking of two multi-agent architectures for production scheduling and control. Computers in Industry, 43(2), 139-152.”

2.8. Outros artigos significativos (mais citados) neste tema

After-sale services

- 81 citações – “Cavalieri, S., Gaiardelli, P., & Ierace, S. (2007). Aligning strategic profiles with operational metrics in after-sales service. International Journal of Productivity and Performance Management, 56(5/6), 436-455.”
- 45 citações – “Legnani, E., Cavalieri, S., & Ierace, S. (2009). A framework for the configuration of after-sales service processes. Production Planning and Control, 20(2), 113-124.”

PSS

- 25 citações – “Pezzotta, G., Cavalieri, S., & Gaiardelli, P. (2012). A spiral process model to engineer a product service system: an explorative analysis through case studies. CIRP Journal of Manufacturing Science and Technology, 5(3), 214-225.”
- 19 citações – “Sassanelli, C., Pezzotta, G., Rossi, M., Terzi, S., & Cavalieri, S. (2015). Towards a Lean Product Service Systems (PSS) Design: state of the art, opportunities and challenges. Procedia CIRP, 30, 191-196.”
- 16 citações – “Legnani, E., Cavalieri, S., Marquez, A. C., & Díaz, V. G. (2010, October). System Dynamics modeling for Product-Service Systems: A case study in the agri-machine industry. In Proc. of APMS.”
- 13 citações – “Zanetti, V., Cavalieri, S., & Pezzotta, G. (2016). Additive Manufacturing and PSS: a Solution Life-Cycle Perspective. IFAC-PapersOnLine, 49(12), 1573-1578.”

2.9. Co-autores recorrentes:

Roberto Pinto; Giuditta Pezzotta; Paolo Gaiardelli; Sergio Terzi; Marco Marchi (ResearchGate)

Giuditta Pezzotta

2.10. Tipo: Pesquisadora Associada
2.11. Idade: ~37 anos
2.12. Anos pesquisando no assunto

Desde 2008 como “After-sale services” (10 anos).
Desde 2009 como PSS (9 anos).

2.13. Instituição: Universitá di Bergamo
2.14. Colegas da mesma instituição

Apenas incluídos colegas do mesmo grupo de pesquisa

- Professores: Sergio Cavalieri; Roberto Pinto; Paolo Gaiardelli; Stefano Dotti
- Pesquisadores: Fabiana Pirola; Emanuele Dovere; Enrico Cagnoni; Francesca Carrara.
- Estudantes: Chiara Cimini; Roberto Sala; Michela Zambetti; Vittorio Zanetti.

2.15. Quantidade de artigos já publicados: 104 (Google Scholar) – (~30 em journals)

2.16. Outros artigos significativos (mais citados) sobre outros temas

- Não há artigos significativos sobre outros temas

2.17. Outros artigos significativos (mais citados) neste tema

After-sale services

Não há artigos significativos sobre after-sale services

PSS

- 223 citações - "Cavalieri, S., & Pezzotta, G. (2012). Product–Service Systems Engineering: State of the art and research challenges. *Computers in industry*, *63*(4), 278-288."
- 44 citações – "Rapaccini, M., Saccani, N., Pezzotta, G., Burger, T., & Ganz, W. (2013). Service development in product-service systems: a maturity model. The Service Industries Journal, 33(3-4), 300-319."
- 33 citações - "Pezzotta, G., Pinto, R., Pirola, F., & Ouertani, M. Z. (2014). Balancing product-service provider's performance and customer's value: The service engineering methodology (SEEM). Procedia CIRP, 16, 50-55."
- 25 citações – "Pezzotta, G., Cavalieri, S., & Gaiardelli, P. (2012). A spiral process model to engineer a product service system: an explorative analysis through case studies. CIRP Journal of Manufacturing Science and Technology, 5(3), 214-225."
- 19 citações – "Sassanelli, C., Pezzotta, G., Rossi, M., Terzi, S., & Cavalieri, S. (2015). Towards a Lean Product Service Systems (PSS) Design: state of the art, opportunities and challenges. Procedia CIRP, 30, 191-196."

2.18. Co-autores recorrentes

Sergio Cavalieri; Paolo Gaiardelli; Fabiana Pirola; Roberto Pinto; Alice Rondini (ResearchGate)

3. Introdução e/ou revisão bibliográfica introdutória, afirmações / constatações (tipo) versus citações (essa lista pode ser longa, por isso coloquei em forma de tabela)

Afirmação / Constatação	Tipo (*1)	Referência (*2)
"The evolutionary path of the business model of a manufacturing company from a pure product perspective towards an integrated product–service orientation is usually termed as	C	(Vandermerwe e Rada, 1988)

servitisation of manufacturing [1].” (Cavalieri e Pezzotta, 2012, p. 278)		
“A number of authors have discussed the servitisation phenomenon with a retrospective analysis by performing longitudinal studies on manufacturing companies which have endeavoured their journey along a ‘‘product–service continuum’’ [2].” (Cavalieri e Pezzotta, 2012, p. 278)	C	(Oliva e Kallenberg, 2003)
“As it is evident from the emphasis given by the related literature, servitisation is mainly motivated by a continuous strive to create new sources of value for the company, by either reactively fulfiling explicit requirements or proactively providing new integrated product–service solutions to the customer.” (Cavalieri e Pezzotta, 2012, p. 278)	C	-
“There are several claimed benefits associated with the augmented content of services within a product [3–8]: an increase of revenues, as services tend to have higher profit margins and can provide a stable and countercyclical source of revenues; a differentiating weapon for competing in mass-markets characterised by commoditised technologies and products, a decrease of variability and volatility of cash flows throughout the life of a product, allowing for a higher shareholder value.” (Cavalieri e Pezzotta, 2012, p. 278)	C	(Mathieu, 2001; Gebauer et al., 2008; Cohen et al., 2006; Wise e Baumgartner, 1999; Mathe e Shapiro, 1993; Gebauer e Friedli, 2005)
“However, although services are thought to deliver higher margins, most organisations find it quite problematic to master the transition.” (Cavalieri e Pezzotta, 2012, p. 278)	C	-
“A Bain and Co’s survey revealed that only 21% of the sampled companies have experienced a real success with their service strategy [9].” (Cavalieri e Pezzotta, 2012, p. 278)	C	(Baveja et al., 2004)
“When increasing their service offerings, they sometimes incur higher costs and eventually do not achieve the expected returns [10,11].” (Cavalieri e Pezzotta, 2012, p. 278)	C	(Gebauer et al., 2005; Neely, 2009)
“Overcoming this hitch represents a major managerial challenge [4].” (Cavalieri e Pezzotta, 2012, p. 278)	C	(Gebauer et al., 2008)
“Companies need to change their current structures and processes that are unsuitable for mastering this integrated offering.” (Cavalieri e Pezzotta, 2012, p. 278)	C	-
“The development of a product–service solution raises new issues since the service component introduces further requirements,	C	(Wang et al., 2011; Ericson e Larsson, 2009; Wild et al. 2009; Alonso-Rasgado et

among which [12–14]: to go beyond the voice of the customer ensuring a connection with his emotional state of mind, his perceptions and preconceptions in a situated and changeable context [15–18]; to encompass a life cycle perspective [19,20]; to fulfil the expectations of a composite group of stakeholders calling for a more sustainable society [21,22].” (Cavalieri e Pezzotta, 2012, p. 278)		al., 2004; Isaksson et al. 2009; Meier et al., 2010; Mcaloone e Andreasen, 2002; Aurich et al., 2010; Sundin, 2009; Lindahl et al., 2006; Meier, 2004)
“A relevant stream of the literature, mainly rooted in the North- European research communities, has assigned an increasing emphasis to the role of Product–Service Systems (PSS) as a concrete response to these emerging pressures. “(Cavalieri e Pezzotta, 2012, p. 278)	C	-
“The basic idea behind the Product–Service System concept is that it ensues from an innovation strategy, shifting the business focus from the design and sales of physical products to the design and sales of a system consisting of products, services, supporting networks and infrastructures, which are jointly capable of fulfiling specific client demands [23–25].” (Cavalieri e Pezzotta, 2012, p. 278)	C	(Mont, 2004; Mont e Plepys, 2004; Mont, 2002)
“Several are the claimed benefits and barriers related to the adoption of Product–Service Systems, as Table 1 highlights [26].” (Cavalieri e Pezzotta, 2012, p. 278)	C	(Baines et al., 2007)
“The profit generation and the commercial success of the Product–Service System offering critically depend on its conceptualisation, design and development, even if this notion has been largely ignored [27].” (Cavalieri e Pezzotta, 2012, p. 278)	C	(Bullinger et al., 2003)
“According to Baines et al. [26], despite the availability of a plethora of tools and methodologies for designing PSS, they are typically a rearrangement of conventional processes and lack a critical and in-depth evaluation of their real performance in practice.” (Cavalieri e Pezzotta, 2012, p. 279)	L	(Baines et al., 2007)
“This is the main motivation behind the upsurge since the ‘90s of Service Engineering as an emerging technical discipline whose foremost aim is to provide a ‘‘systematic development and design of services using suitable models, methods and tools as well as the management of the service development process’’ [19].” (Cavalieri e Pezzotta, 2012, p. 279)	C	(Aurich et al., 2010)

“Given its increasing relevance in academic and industrial contexts with a resulting proliferation of scientific contributions and white papers, the purpose of this paper is to provide a holistic conceptualisation and an up-to-date review of the literature on Service Engineering with a specific focus on its adoption in the PSS context.” (Cavalieri e Pezzotta, 2012, p. 279)	J	-
“A critical analysis is performed to ascertain the capability of the current literature to provide a valid response to the main issues and challenges marking this field.” (Cavalieri e Pezzotta, 2012, p. 279)	J	-
“The final part of the paper delivers a research agenda with a list of the main key actions which in our opinion will drive relevant themes for future research investigations.” (Cavalieri e Pezzotta, 2012, p. 279)	G	-
There has been an evolution in the way an integrated solution is being engineered: from sequential stage-gate based engineering to concurrent engineering.	C	-
The latter refers to a work methodology based on the parallelisation of tasks throughout product development between design, engineering, manufacturing and support functions in order to reduce the elapsed time required to bring a new product to the market [28–30].	C	(Brookes e Backhouse, 1998; Dixon e Poli, 1995; Yazdani e Holmes, 1999)
According to Hara et al. [31], an integrated offering based on either of these two approaches suffers from two main problems: (i) an increasing gap between product function and customer value; (ii) a separation of product and service activity design, since these processes are normally performed by personnel with different skills and expertise.	C	(Hara et al., 2009)
What is nowadays clear is that product functions and service activities should be integrated seamlessly from the early stages of value and service content generation [32,33].	C	(Aurich et al., 2006; Alonso-Rasgado e Thompson, 2006)
Both are means for value creation, and different combinations of them can fulfil the same needs of the potential customers.	C	-
Compared to physical products, services are generally under- designed and inefficiently developed [34].	J	(Froehle et al., 2000)
Behara and Chase [35] quip that ‘‘if we designed cars the way we seem to design services, they would probably come with one axle and five wheels’’.	C	(Behara e Chase, 1993)

Most publications emphasise the importance of the development of services, but they fail to provide specific assistance on how to embed these services into the strategic and operative management of enterprises.	C	-
For this reason, many approaches have been developed during the years to support the design and development of service either as a system itself or as a constituting element of a Product–Service System.	C	-
The first scientific studies about service development were introduced in Anglo-American publications as early as the 1970s and 1980s, when terms such as ‘‘New Service Development’’, ‘‘Service Design’’ and ‘‘Service Engineering’’ appeared in the literature.	C	-
At that time, New Service Development (NSD) began to find its way as an overall process of developing new services, from idea generation to market launch.	C	-
The first contributions were mainly marketing-driven focusing on success and obstacle factors [19,27,36,37].	C	(Aurich et al., 2010; Bullinger et al., 2003; Bowers, 1985; Fähnrich e Meiren, 2007)
Despite the flourishing of empirical studies, for many years there has not been consensus on a well-formalised development process, leading to contradictory results [38].	C	(Stevens e Dimitriadis, 2005)
Hence, several efforts have been devoted to filling the evident lack of research with more systematic approaches finalised to the provision of a comprehensive framework which could be consid- ered as a reference in the field [39–43].	C	(Johne e Storey, 1997; Edgett,, 1994; Fitzsimmons e Fitzsimmons, 2000; Lin e Hsieh, 2011)
Also the term Service Design finds its roots in the Anglo- American literature in the same years.	C	-
Unlike NSD, which is mainly focused on a marketing and strategic level, Service Design specifically addresses the structure and content of a service operation [44].	C	(Roth e Jackson, 1995)
Given the nature of service, research in this field is primarily based on interaction design, especially in terms of perceivable elements of a service (e.g. colours, sounds, odours) and interfaces with the customer [45–48].	C	(Holmlid e Evenson, 2008; Edman, 2011; Meiren, 2011; Spath et al., 2007)
Broadly speaking, Service Design is considered an exploratory enquiry with the aim to develop a proper understanding about what is being designed and to involve end-users in creating meaning through a creative process [49].	C	(Hatcheul, 2002)

It differs from the other disciplines, since it looks at services from an outside-in perspective, privileging the user's context rather than the internal strengths, weaknesses and potential barriers of the organisation [37,45,46,50].	C	(Fähnrich e Meiren, 2007; Holmlid e Evenson, 2008; Edman, 2011; Kimbell, 2011)
The inability of these two main research streams to approach service design and development with a systematic and extensive perspective (considering both user's and organisation's require- ments) and with a seamless integration of tangible (product) and intangible (service) contents has impressed further interest on the potential of the Service Engineering (SE) field.	C	-
The discussion on SE became significantly relevant only in the mid-1990s, with research initiatives in Germany and Israel.	C	-
Contrary to the prevalent marketing perspective of New Service Development, Service Engineering aims to apply the engineering- scientific know-how to develop Service Systems and Product– Service Systems in a systematic and methodological way [19,27].	C	(Aurich et al., 2010; Bullinger et al., 2003)
It is a rational and heuristic approach based on the discussion of alternatives, goals, constraints and procedures, through the adoption of modelling and prototyping methods [45].	C	(Holmlid e Evenson, 2008)
Despite the different perspectives, the fundamental research questions investigated by these streams are even more inter- twined, thus motivating a strong interaction and overlapping of the relative research communities and witnessing an increasing difficulty to categorise a single contribution in a specific area.	J	-

(*1) Tipos de afirmação / constatação: G (geral), C (contexto), J (justifica o artigo / pesquisa), L (**explicita a lacuna**). A constatação da lacuna é muito importante. Mas é difícil diferenciar J de L.; (*2) Inserir somente autor(es) e ano. A referência completa encontra-se no próprio artigo

4. Casos citados e principais características dos casos

    - NADA

5. Questão da pesquisa, Foco (escopo) e Objetivos (geral primário e secundários)

    - Objetivo: "the purpose of this paper is to provide a holistic conceptualisation and an up-to-date review of the literature on Service Engineering with a specific focus on its adoption in the PSS context." (Cavalieri e Pezzotta, 2012, p. 279)

- Não há questão de pesquisa explícita.

- O foco da revisão é a literatura de Service Engineering e sua adoção no contexto do PSS.

6. Qual o diferencial deste artigo (análise da revisão) com relação a outras revisões e/ou surveys? (segundo o autor, caso ele tenha citado). Avaliar uma por uma, caso o autor tenha feito isso. Pode montar uma tabela se for o caso.

    - NADA

7. Metodologia
    7.1. Descrição Geral: Nome do(s) método(s); se é qualitativo, quantitativo ou combinação de ambos

    - Qualitativo. Não cita método de pesquisa, mas parece ser análise de conteúdo a partir de uma categorização pré-estabelecida (3 perspectivas – teórica, sistemas e engenharia de sistemas) de artigos derivados de revisão de literatura.
    - "To understand what has been developed in Service Engineering research and to identify open research gaps and future challenges, a research map on the most relevant literature currently available on Service Engineering and Product–Service System Engineering has been designed." (CAVALIERI; PEZZOTTA, 2012, p. 280)

    7.2. Período de análise das referências (publicações desde que ano)

    - Publicações dos últimos 10 anos (2002 a 2012).

    7.3. Tamanho da amostra analisada

    - NADA.

    7.4. Quantidade de referências citadas

    - 114 artigos

    7.5. Foram realizadas observações complementares?

    - NADA.

    7.6. Fontes da revisão (casos, periódicos específicos, e quais bases de dados). Quais as justificativas para escolher essas fontes.

    - Scopus e ISI Web of Knowledge. Não há justificativa para escolher essas fontes.

    7.7. Estratégia para construção da string de busca

    - NADA.

7.8. String de busca

- “Service Engineering”
- “Product-Service System”
- “Service Development”
- “Service Design”

7.9. Filtros

- Análise de resumos e palavras-chave.
- “The selection was limited to those papers proposing models, methodologies, methods and tools under the Service Engineering perspective. For contributions related to the same research track, only one representative publication was considered.” (Cavalieri e Pezzotta, 2012, p. 280)

7.10. Técnica / método de análise utilizada

- Categorização dos artigos em categorias mostradas na tabela 2 (Table 2) do artigo.

7.11. Metodologia para definição de pesquisas futuras

- Criação de um mapa de pesquisa com os trabalhos mais relevantes na área.
- “To understand what has been developed in Service Engineering research and to identify open research gaps and future challenges, a research map on the most relevant literature currently available on Service Engineering and Product–Service System Engineering has been designed.” (Cavalieri e Pezzotta, 2012, p. 280)

8. Resultados

8.1. Quantidades resultantes antes e após cada filtro

- 118 artigos encontrados. Após o filtro, 79 artigos resultantes.

8.2. Definições (resultantes da análise ou mesmo adotadas como premissas no início da publicação)

- Servitisation of manufacturing: “The evolutionary path of the business model of a manufacturing company from a pure product perspective towards an integrated product–service orientation.” (Cavalieri e Pezzotta, 2012, p. 278)
- Service Engineering: “an emerging technical discipline whose foremost aim is to provide a ‘‘systematic development and design of services using suitable models, methods and tools as well as the management of the service development process’’ [19].” (Cavalieri e Pezzotta, 2012, p. 279)
- Concurrent Engineering: “a work methodology based on the parallelisation of tasks throughout product development between design, engineering, manufacturing and support functions in order to reduce the elapsed time required to bring a new product to the market [28–30].”

- System: ‘‘a collection of real or abstract interdependent entities – hardware, software, people, facilities and procedures – organised as a whole in order to accomplish a common set of goals’’ (Cavalieri e Pezzotta, 2012, p. 280)
- Systems Engineering: “According to INCOSE (the International Council on Systems Engineering), Systems Engineering is conceived as an interdisciplinary approach and means to enable the realisation of a system and its constituent entities, interacting with the most relevant stakeholders and actors throughout the system’s life cycle [54].” (Cavalieri e Pezzotta, 2012, p. 280)
- Entities: “Real or abstract, tangible or intangible, whose relationship forms the PSS as a whole.” (Cavalieri e Pezzotta, 2012, p. 280)

8.3. Evolução da pesquisa / das publicações no assunto

- A evolução da pesquisa no assunto não fica clara no artigo;
- Há uma tentativa de apontar que o “New service development” foi sucedido pelo “service design”, o qual, por sua vez, foi sucedido pelo “Service engineering”. Mas os termos têm origens aproximadamente na mesma época. Parece apenas que são “tribos” diferentes.

8.4. Comunidades / “tribos” / “igrejas”/ áreas de conhecimento / disciplinas identificadas

- New service development
- Service design
- Service engineering.

Outra classificação:

- Perspectiva teórica
    - Pesquisa conceitual analítica
    - Pesquisa experimental empírica
    - Estudo de caso empírico
- Perspectiva de sistemas
    - Ciclo de vida
    - Entidades
    - Atores
- Perspectiva de engenharia de sistemas
    - Processo
    - Prática

8.5. Características de cada tribo (os atributos e/ou explicações são definidos pelo próprio artigo)

- New service development → Cobre desde a geração de ideias ao lançamento no mercado. Foco estratégico e orientado ao mercado, com grande atenção aos fatores de sucesso e obstáculos.

- Service design → Foco na estrutura e conteúdo da operação do serviço.
- Service engineering → Aplicar o conhecimento científico da engenhaira para desenvolver sistemas de serviços e PSS.

Outra classificação:

- Perspectiva teórica
    - Pesquisa conceitual analítica: “develop new theories, models or frameworks based on a logical relationship among past theoretical assumptions, premises and axioms.” (Cavalieri e Pezzotta, 2012, p. 281)
    - Pesquisa experimental empírica: “understand whether direct experiments are able to confirm or falsify their theories” (Cavalieri e Pezzotta, 2012, p. 281)
    - Estudo de caso empírico: “Few researches adopt empirical case studies with the aim to develop theory based on a limited set of companies.” (Cavalieri e Pezzotta, 2012, p. 281)
- Perspectiva de sistemas
    - Ciclo de vida: “Only a few approaches have been conceived with a whole life cycle perspective of the development process and of the related methods and tools (e.g. [20,21,32,58,64]).” (Cavalieri e Pezzotta, 2012, p. 282)
    - Entidades: “Physical products can be either part of the service contents or the service channel itself. The combination of these two elements makes up the added value to the final customer. This vision, adopted from the Japanese school, is not far from Meier and Sadek [56], where the existential origin of a PSS artefact is a function, and could be represented by the constructs ‘‘IPS2-object’’ (Industrial Product Service System) and ‘‘IPS2-process’’.” (Cavalieri e Pezzotta, 2012, p. 282)
    - Atores: “Product–Service Systems are forcing a new understanding of relationships, and many stakeholders are involved in the provision of sustainable and ecological solutions [17,19,25,59,65,90,91].” (Cavalieri e Pezzotta, 2012, p. 282)
- Perspectiva de engenharia de sistemas
    - Processo: “Research in the engineering environment is traditionally grounded in those contributions whose main purpose is to define ‘‘WHAT’’ (as a process) needs to be performed,” (Cavalieri e Pezzotta, 2012, p. 283)
    - Prática: “Another significant part of the literature has provided contributions on ‘‘HOW’’ the process phases and related tasks have to be carried out through the adoption of appropriate practices, in terms of methods and tools required to perform the single activities and phases.” (Cavalieri e Pezzotta, 2012, p. 284)

8.6. Principais “achados” (*findings*)

- “Few publications have been published in high-ranking journals, even if a step-wise increase is evident. Due to the novelty of the field, most interesting

publications reporting new ideas are mainly available in conference proceedings" (Cavalieri e Pezzotta, 2012, p. 285)

- "A common terminology in the design and development of integrated solutions is not yet available, since an overlapping of meaning among terms is evident" (Cavalieri e Pezzotta, 2012, p. 285)
- "A comprehensive approach able to encompass all the different system elements of PSS Engineering process is missing, even if several efforts have been produced in this direction. A multi-disciplinary orientation is one of the core aspects for embracing and integrating the different perspectives of the system elements" (Cavalieri e Pezzotta, 2012, p. 285)
- "A common understanding on how it is possible to systematically deal with the field is not yet available. Due to the absence of a reference model and framework, most of the literature still dwells on their definition and on the identification of the most suitable supportive methods" (Cavalieri e Pezzotta, 2012, p. 285)
- "A strong effort is evident in the development of specific IT tools able to support the practical adoption of the Service Engineering methods. However, few working tools are available and also adopted in real contexts" (Cavalieri e Pezzotta, 2012, p. 285)
- "The practical application of existing theories in industry is really occasional, as the absence of empirical applications demonstrates. Few of the existing theories and researches report detailed practical implications" (Cavalieri e Pezzotta, 2012, p. 285)
- "Coherence: this driver evaluates the existence of a common focus in the research field, as opposed to a multiplicity of paradigms. Nowadays, the Service Engineering field cannot be defined as ''coherent'', mainly due to the absence of a common terminology and of a shared framework which can be considered as a standard in the field." (Cavalieri e Pezzotta, 2012, p. 286)
- "Quality: among others, this parameter relates to the quality of publications, considering also where they have been published. From the extensive literature review conducted in this paper, it is evident how a high number of contributions origin from conference proceedings rather than from well ranked scientific journals." (Cavalieri e Pezzotta, 2012, p. 286)
- "Impact: this measure refers to the grade of application of the existing theories both in the research field and in the industrial context. From our analysis, the majority of contributions are mainly paper-based with scattered applications in real industrial contexts." (Cavalieri e Pezzotta, 2012, p. 286)

8.7. Outros tópicos que não foram tratados aqui (sugestão para nova meta-informação ou resultados significativos)

- Estruturação dos elementos base para o PSS design (Figura 1) (Cavalieri e Pezzotta, 2012, p. 285)

8.8. Proposições de pesquisas futuras (geral)

- “to overcome the blurriness between the various disciplines involved in Service Design and Development, a sound and unambiguous statement of their boundaries should be formalised;” (Cavalieri e Pezzotta, 2012, p. 286)
- “to support the consolidation of research on a common ground and to foster a factual application of the Service Engineering discipline in the industrial world, all the research efforts should converge towards the definition of a shared reference framework (in terms of processes and practices) which could turn into a recognised standard for the community; ” (Cavalieri e Pezzotta, 2012, p. 286)
- “to provide an effective and immediate return of research findings into pragmatic knowledge, there is the compelling need to elicit good practices with a clear understanding of the applicability of the methods; this would pave the way for their subsequent deployment into commercially available IT tools; ” (Cavalieri e Pezzotta, 2012, p. 286)
- “to overcome the technocratic culture in the industrial organisation, the emerging profile of the Service Engineer should find its proper location in the organisational chart with the same level of decision-making responsibilities and prerogatives as the traditional product engineers;” (Cavalieri e Pezzotta, 2012, p. 286)
- “the professionalism and competence of such a profile should be grounded on a solid academic background; this requires a further consolidation of the Service Engineering knowledge through the delivery of purposely designed graduate and postgraduate courses.” (Cavalieri e Pezzotta, 2012, p. 286)

8.9. Contribuições (para academia / prática / ambas?)

- “In our opinion, these research lines will contribute to a better understanding and clearness of the scope of research in the Service Engineering domain and will provide a common identity for the scientific and industrial community operating in this promising field” (CAVALIERI; PEZZOTTA, 2012, p. 286)

9. Conclusões

9.1. Trabalhos futuros (que o autor se propõe, diferente das proposições futuras)

- NADA

9.2. Limitações

- NADA escrito explicitamente, porém há limitações claras como, por exemplo, a string e a limitação de artigos dos últimos 10 anos.

10. SUA ANÁLISE

10.1. Pontos fortes

- A análise é relativamente profunda e bastante crítica.
- A categorização dos artigos organiza e estrutura a discussão.
- A leitura do artigo é bastante fluida e agradável.
- O artigo parte de uma pré-estruturação do PSS em elementos base, que são utilizados para auxiliar na estruturação da discussão.
- É muito interessante que o artigo tenha proposto uma seleção de maiores contribuições para PSS engineering.

10.2. Pontos fracos

- A variedade de palavras chave é muito pequena. Há diversas outras palavras chave relacionadas ao tema que não foram incluídas na string, como “servitization”;
- Faltou uma perspectiva temporal (evolutiva) do Service Engineering no contexto do PSS. Poucas vezes os artigos foram associados ao momento em que foram publicados.
- Falta estruturação na escrita da metodologia de pesquisa. Os autores reportam a string de busca, a forma que o filtro foi realizado e as categorias utilizadas para dividir os artigos. Porém a explicação é um pouco “solta” no texto, faltando uma estruturação maior da pesquisa para garantir replicabilidade.

10.3. Sugestões para melhoria do artigo

- Incluir outras palavras chave que complementem a busca inicial por artigos, como, por exemplo, “total care products” e “functional products”, entre diversas outras.
- Inserir uma perspectiva temporal e evolutiva dos trabalhos.
- Se referir a uma metodologia de pesquisa mais estruturada.
- Reportar as limitações do trabalho e ressaltar de forma mais explícita as contribuições.
- Os critérios para elaboração da lista de maiores contribuições para PSS engineering parece muito subjetivo. Seria interessante descrever de forma mais objetiva os critérios utilizados.
- A figura 1 poderia ser melhor explicada, detalhando como ela foi criada.

11. Figuras ou tabelas importantes (caso você queira copiar e citar nos tópicos anteriores)

Table 2
Main criteria adopted for classification of the papers.

Theoretical perspective	Analytical conceptual research
	Empirical experimental research
	Empirical case study
System perspective	Life cycle (phases and iteration)
	Entities (content, channel)
	Actors (society and environment, customer and user and channel)
System Engineering perspective	Process (frameworks and models)
	Practice (methods and tools)

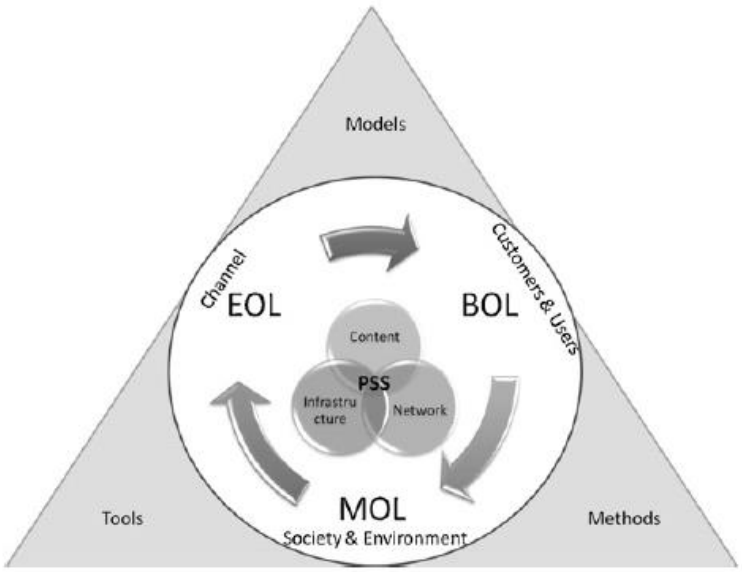

Fig. 1. A system view of PSS Engineering.