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Contractual New Product Introduction: Framework for Customer and Service Provider Collaboration

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Abstract:

Purpose: *The purpose of this paper is to introduce a cooperative approach to Contractual New Product Introduction (CNPI), a process by which outsourcing companies launch new products on behalf of their customers. While new product development is widely covered in existing literature, the specific context of outsourcing organisations and the contractual introduction of new products has received limited attention. This research addresses this gap, highlighting the strategic importance of CNPI in fostering long-term customer relationships throughout the product life cycle.*

Design/Methodology/Approach: *The study is based on a systematic literature review combined with the authors' extensive practical experience in outsourcing environments. The research synthesises insights from both closely related and peripheral domains to form a comprehensive understanding of CNPI. A conceptual model is proposed to guide practitioners and researchers in structuring and executing the CNPI process effectively.*

Findings: *The paper identifies the need for a systematic framework tailored to CNPI and presents a conceptual model that promotes customer-centred decision-making and collaboration. It integrates all relevant phases—from concept design to production launch-emphasising parallel workflows, continuous feedback loops, and cross-functional cooperation. The model outlines how service providers can align their structures and processes to meet future CNPI demands and improve business outcomes.*

Practical Implications: *The proposed approach offers actionable guidance for outsourcing companies, enabling them to streamline CNPI activities, reduce costs, and enhance stakeholder collaboration. The framework clarifies deliverables at each stage and supports more efficient execution of the new product introduction process. It also provides a foundation for identifying and addressing potential stakeholder concerns related to phase gate deliverables.*

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Originality/Value: *This study is among the first to explore CNPI from the perspective of outsourcing service providers with the customer as project initiator. The research delivers a novel conceptual framework that bridges gaps in current literature and practice. It contributes valuable insights into the organisational requirements and success factors essential for next-generation CNPI processes.*

Keywords: *New product introduction, service provider, customer involvement, phase-gate model.*
JEL codes: *D20, M11, O32.*

Paper type: *Conceptual article.*

1. Introduction

This study aims to develop a New Product Introduction (NPI) process structure suitable for outsourcing organizations and describe significant relationships between the customer and the service provider, drawing on the existing NPD and NPI processes in manufacturing companies. The formal approach to New Product Development (NPD) provided in the literature promotes effectiveness and efficiency of product launches, coupled with striving for innovation, flexibility, and integration with several disciplines.

Previous studies have presented several NPD models (Alam and Perry, 2002; Bowers, 1989; Lin *et al.*, 2010; Scheuing and Johnson, 1989), nevertheless, introduction of new products on behalf of the customer as well as the importance of customer involvement in this process have been ignored. The need for such research derives from the fact that contractual new product introduction plays a crucial role in establishing long-term relationships with customers throughout the entire product life cycle.

Although particular NPD phases have been defined in the approaches advanced in the literature, not all of the steps required for the development of a systemized CNPI framework have been included. This paper aims to fill the gap by putting forward a conceptual model of CNPI as a phase-gate process based on the integration of and interaction among different disciplines.

The framework is intended as a tool for project managers to generate ideas for managing the process to achieve positive business results. The paper is structured in the following way: in Section 1, various definitions from a related domain, namely outsourcing, are analyzed, as are different approaches to outsourcing services. Based on the analysis, gaps are pointed out in the available approaches to outsourcing NPI services, and thus areas requiring further study are established. The rationale for the study is presented.

Section 2 concentrates on the research method. The methodology developed for this study involves five steps, which are explained in this section. An in-depth literature review follows the description of the research methodology. The theoretical framework based on quantitative and qualitative research is described in Section 3.

Theoretical insights into NPD and NPI gleaned from preselected sources are presented, followed by a summary of approaches to NPI, NPD, and NPPD advanced in the current literature. The need to develop a new approach to outsourcing NPI is demonstrated. Next, in Section 4, the proposed CNPI model is introduced. The section also provides a rationale for the development of a new framework based on the phases, gates, and disciplines that have been identified in CNPI.

A discussion of the proposed approach is presented in Section 5. Attention is drawn to the differences between the well-established NPD and NPI and the new CNPI. The paper concludes with a summary description of the model, its contribution, and suggestions for further study. A descriptive CNPI model is employed in the article to enable theory extension. It affords valuable insights into how different disciplines collaborate, interact, and how they are connected.

2. Collaboration in Outsourcing: Definitions and Characteristics

Collaboration in outsourcing relies on the supplier's understanding of the work delegated by the customer (Oshri *et al.*, 2018). Various forms of outsourcing have been used throughout human history. For instance, the lords of European countries delegated the organization of education structures to the convents (Foltys, 2012).

Although, from a historical perspective, the foundations of the outsourcing industry were established in the 1980s. In 1979, German automobile manufacturers first used the term 'outsourcing' in the Journal of the Royal Society of Arts (Vol. CXXVII, 141/1) in the context of outsourcing engineering services (Amiti and Wei, 2005). Hence, the first long-term outsourcing projects were executed between the contractor and the employer, which has since become the standard in business operations (Mubako, 2019).

According to the Online Etymology Dictionary, the origins of the word 'outsourcing' are associated with the verb 'outsource', derived from the adverb 'out' and the noun 'source'. Some authors, e.g., Arnold (2000) and Trocki (2001), argue however that the word 'outsourcing' may also be an abbreviation of the phrase 'outside resource using' (Arnold, 2000; Trocki, 2001).

Many research studies have been published to promote outsourcing. Table 1 illustrates the definitions found in the reviewed literature. Their broad range provides a synopsis of the different interpretations of the term and shows how frequently it is discussed in the literature.

Table 1. *Terminology related to outsourcing. A historical perspective*

Author	**Definition**
Ford H. *Pioneer of the principle underlying outsourcing*	Ford formulated a revolutionary hypothesis which became the motto of outsourcing: 'If there is something we cannot do more efficiently, cheaper, and better than our competitors, it makes no sense for us to do it. We should hire someone to do the job better.'
General Motors (1980s)	According to GM, when selected services are outsourced, there is an opportunity to turn some fixed costs into variable costs.
Penc J. (1997)	Outsourcing is 'the possibility of using comprehensive services offered by external contractors. The purpose of using outsourcing requires not only selecting the right bidder but also precisely determining the needs for services that can be satisfied by external contractors, and a reliable calculation of their profitability (purchase price, quality, and reliability of performance).'
Greaver M. F. (1999)	'Outsourcing is the act of transferring some of the repetitive internal operations and decision-making rights of the organization to external suppliers, as stated in the contract. As activities are repeated, and the contract is used, outsourcing goes beyond the use of consultants. In practice, not only activities are transferred, but also factors of production and decision-making rights. Resources are the factors of production in terms of human capital, devices, equipment, technology and other assets. Decision-making powers shall be accountable for the delegated activities.'
Trocki M. (2001)	The concept of outsourcing was created by combining the English words 'outside' and 'resource'. 'This is a project depending on separating the functions from the organizational structure of project initiator and transferring them to other economic entities for implementation.'
Corbett M. F. (2004)	Outsourcing is a form of sharing knowledge, experience as well as technological solutions between partners. The most common motive driving entrepreneurs to start cooperation with a selected vendor. Outsourcing is the desire to reduce operating costs.
Grudzewski W. M., Hejduk I. K. (2004)	The word 'outsourcing' is an abbreviation of the three English words: outsider, resource, and using/use, whose combined meaning is: using external sources.
Power M. J., Desouza K., Bonifazi C. (2006)	The decision to outsource the work is made when there are other companies that can do it better, faster, and cheaper. The end result is also important.
Kremic T., Tukel O. I., Rom W. O. (2006)	Outsourcing is a common practice in private and public institutions which has become a significant element of the business strategy. It is mainly characterized by outsourcing selected services to entities specialized in providing them. Outsourcing can bring many benefits but also carries serious risks if it has not been thought out well.
Matejun M. (2006)	Tactical outsourcing is separating the parent company, not related to the strategic goals, and implementing tactical outsourcing for periods shorter than the strategic horizon of the organization.
Rybiński K.	Outsourcing is the transfer of production, services, or part of

Author	Definition
(2008)	procurement processes to another company.
Bendor-Samuel P. (2008)	Outsourcing is a form of cooperation between the customer and the service provider based on the terms and conditions specified in the contract. The customer does not control the process of creating the service entrusted to the service provider; the customer is only interested in the final result.
Zimniewicz K. (2009)	Outsourcing is a change management method whose main task is to reduce the company's costs, acquire know-how, and maintain or increase the quality of services.
Kopczyński T. (2010)	Outsourcing means separating from the organizational structure or transferring certain functions and responsibilities to an external organization, based on a long-term contractual agreement. Outsourcing means establishing partner relations with that external organization to increase the effectiveness of the enterprise.
Marcinkowska E. (2012)	Contract outsourcing means separating a function from the company and transferring it to an independent entity. Layoffs or transfer of employees within the organizational structure are possible negative results of using this type of outsourcing.
Waśniewski J. (2015)	Outsourcing is the transfer of part of business functions to specialized external entities.
Gomułka A. (2016)	Outsourcing is a process of separating certain activities from the company's organizational or functional structure and transferring them to an external economic entity that is independent of the contracting enterprise in terms of capital.
Nowicka K. (2016)	Outsourcing means taking advantage of the service provider's skills and resources employed to complete the process. Resources used to execute the order are chosen based on the provider's know-how, which provides a significant added value for the Customer.

Source: *(Corbett, 2004; Gomułka, 2016; Greaver, 1999; Grudzewski and Hejduk, 2004; Kopczyński, 2010; Kremic et al., 2006; Marcinkowska, 2012; Matejun, 2006; Nowicka, 2016; Penc, 1997; Power et al., 2006; Rybiński, 2008; Trocki, 2001; Waśniewski, 2015; Zimniewicz, 2009).*

There are some conclusions to be drawn from the analysis of the definitions of the term 'outsourcing'. First, they tend to overlap. For instance, most of them indicate that companies should consider outsourcing when they realize that certain support operations can be done better, faster, or more economically, by an external organization.

Furthermore, the customer is not involved in the outsourced activities and therefore does not control the process outsourced to the service provider. The customer expects to benefit from the outsourcing, e.g. achieve reduced costs, better operational and quality system, or increased skills efficiency. However, whether these expectations are satisfied depends on the stability of the relationship between the customer and the service provider. In essence, everything hinges on how well the communication and cooperation between them proceed. Since an increasing number

of organizations are recognizing the importance of outsourcing, production outsourcing by way of Contractual New Product Introduction (CNPI) is a worthwhile area for further study.

The secondary research concerning characteristics and definitions of outsourcing was instrumental in the establishment of the research problem. This paper provides a comparative analysis of the CNPI model and production outsourcing against standard NPD in manufacturing organizations.

3. Research Method

This study aims to develop a framework for Contractual New Product Introduction that could be useful in further empirical studies. To this end, it is necessary to identify relevant criteria corresponding to and differentiating various approaches to new product development and new product introduction approaches. The methodology applied in this study involves five steps, illustrated in Figure 1.

Step 1 includes comprehensive and thorough selection and analysis of contributions from different streams of research. Even though research on new product development/introduction has produced a respectable number of literature reviews in recent years, before the 1960s, innovation was perceived as one of the least comprehended business management processes (Souder, 1987). Following general increase in scientific and engineering capacity, it is easier today to demonstrate that new product development brings competitive advantage (Clark and Fujimoto, 1991).

The literature considered in this study was sourced from several databases that currently represent the primary sources of peer-reviewed publications and enable detailed and well-structured analysis of specific research topics. Typically, at least two academic sources are used (Ebsco, Scopus and ScienceDirect) for a comprehensive survey of research in the field (Ferreira *et al.*, 2019).

Taking into account the large number of documents in the databases, the following search criteria were adopted:

- only articles published in sources indexed as journals were considered relevant;
- no restrictions were applied as to the time of publication, considering that all databases indexed contributions through 2021;
- national and international publications were included to ensure diversity of perspectives.

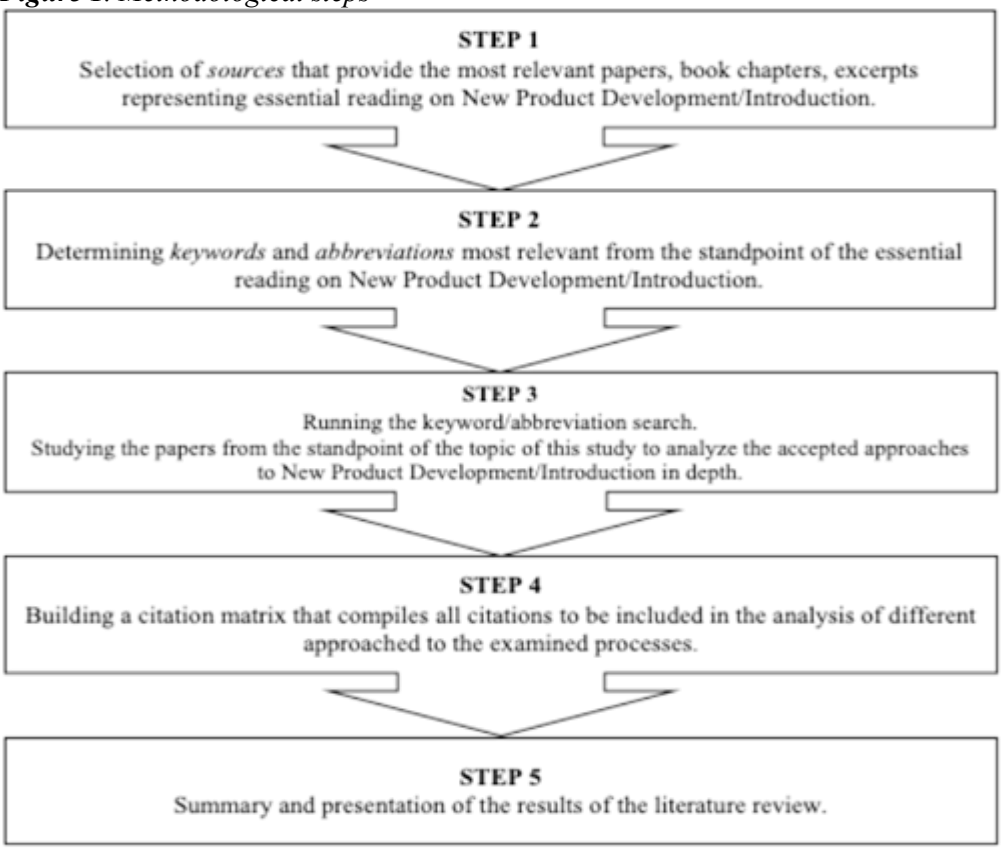
Next, in Step 2, the keywords and abbreviations relevant to the topic of this study were identified to enable selection of a set of the most relevant papers for further thorough analysis in Step 3. They were as follows: '*NPI*' AND '*Customer Involvement or Customer Participation*' OR '*NPI*' AND '*Connection in*

relationship' OR '*NPI*' AND '*Service provider*' OR '*NPI*' AND '*Quality Planning*'. Step 3 also involved gathering all relevant information about each analyzed paper as well drawing conclusions for building the citation matrix.

In Step 4 the citation matrix was established that included selected citations from papers turned up in the quantitative search. This step provided the groundwork for further discussion as it enabled explanation and interpretation of the approaches and definitions proposed by selected authors in the literature. Building on the approaches identified in the literature, an interpretive analysis was performed to serve as input for further research.

A comprehensive summary of the discussed definitions and characteristics of the selected approaches was made in the final but equally important Step 5. Critical and thematic analyses were conducted to bring the focus down to several review studies that were the most meaningful from the standpoint of the application of a systems approach or a hybrid approach which combined qualitative and quantitative content analysis.

Figure 1. *Methodological steps*



Source: *Author's collaboration.*

Such a systematic approach to the literature review affords an improved and comprehensive view of the scholarship produced around the central topics of new product development/introduction. Moreover, it enables correct reading and interpretation of the conceptual model presented in the following sections.

4. Literature Review

4.1 Theoretical Background

Several studies have pointed to the structure of the new product development and introduction processes (NPDI), or particular activities within the development phase, as critical to the success of the new product (Parry *et al.*, 2008). The NPDI processes are a set of activities performed by organizations when new products are developed and launched.

Companies may adapt the NPDI processes to match their specific needs and resources (Bingham and Quigley, 1989). Wind and Mahajan (1997), Chandy and Tellis (1998), Nerkar and Roberts (2004), and Rubera and Kirca (2012) have emphasized potential gains from new product introductions (Chandy and Tellis, 1998; Nerkar and Roberts, 2004; Rubera and Kirca, 2012; Wind and Mahajan, 1997).

Table 2 provides the rationale for the study. It shows quantitative results of the search by NPD and NPI abbreviations in the selected sources. The figures only represent the number of all publications in which the abbreviations NPD and NPI appear. They do not say anything about the potential relevance of these publications. Several conclusions follow from the data presented in Table 2.

Both abbreviations, NPD and NPI, are very well represented in the examined scientific sources. The number of publications in which they are featured is considerable, therefore finding those that do indeed deal with specific issues requires a more thorough search. However, the number of publications where NPI processes are discussed in relation to outsourcing organizations appears to be rather limited, and therefore this issue is worthy of further consideration. A knowledge gap has been identified that further research could close.

Table 2. *Quantitative results of abbreviation search in the selected resources*

Keywords / Sources	NPD	NPI	NPI AND Manufacturing	NPI AND Outsourcing
Google Scholar	184 000	145 000	12 700	1 610
EBSCO	59 414	46 478	11 866	1 165
ScienceDirect	9 582	8 381	503	47
ProQuest	8 858	9 956	515	55
Web of Science	5 853	5 668	23	0

Keywords / Sources	NPD	NPI	NPI AND Manufacturing	NPI AND Outsourcing
SCOPUS	5 550	3 508	85	4
Springer Link	4 596	3 871	98	17
Ebook Central	2 210	1 552	2	0
Access Engineering	78	26	0	0
IBUK Libra	25	37	0	0

Source: *Author's calculations.*

A further quantitative search was also performed. This time, the search phrases were more specific to limit the range of publications that could be meaningful for further study. Table 3 shows the combinations of abbreviations and keywords that were deemed of primary importance from the standpoint of this study. The first conclusion one can draw is that those combinations yielded a more concise list of publications related to the main research topic. On the other hand, the number of publications featuring the search phrases is clearly limited.

Table 3. *Quantitative results of the search for abbreviations and keywords in the selected resources*

Keywords / Sources	NPI AND Customer Involvement or Customer Participation	NPI AND Connection in relationship	NPI AND Service Provider	NPI AND Quality Planning
Google Scholar	2 480	16 800	6 680	16 500
EBSCO	699	4 463	3 338	4 334
ScienceDirect	185	1 206	750	1 723
Springer Link	59	721	465	1 103
Web of Science	28	29	19	7
Access Engineering	14	5	13	13
SCOPUS	3	12	35	11
ProQuest	0	0	0	0
Ebook Central	0	0	0	0
IBUK Libra	0	0	0	0

Source: *Author's calculations.*

As for traditional NPD, several methods of modeling that process have been put forward, depending on the complexity of the requirements (Marsan *et al.*, 1998). Nevertheless, it is important to understand the NPI process because it creates value in the form of new products, both during their development and after their introduction (Kyriakou *et al.*, 2017).

Table 4 summarizes the approaches to the NPI, NPD, and NPPD processes advanced in the previous studies which facilitate understanding the complexity of and communication linkages in these processes. This study testifies to the significance of

adopting an appropriate approach to sequential introduction of new products and incorporating insights gained from previous product introductions (Sharma *et al.*, 2018).

Table 4. *Previous studies on accepted approaches to NPI, NPD, and NPPD processes*

Study	Definition	Approach	Stages	Outcomes
Bergen S.A., McLaughlin, C.P. (1988); Langowitz S. (1989); Voss and Winch (1996); Sherman et al. (2000); Swink and Calantone (2004); Atuahene-Gima (2005); Partanen and Haapasalo (2004); Ahmad et al. (2010)	Cross-functional coordination and collaboration between marketing, NPD, and production.	Cross-functional NPD activities	Market analysis, concept development, product development, implementation	NPD project performance
Faems et al. (2005); Knudsen (2007); Ryall (2013)	Inter-organizational collaborative arrangements, i.e. collaboration with customers, suppliers and even competitors; they allow companies to develop products faster and offer greater product variety.	Relationships between companies	Original idea, perfect innovation	Innovative performance
Atuahene-Gima and Evangelista (2000); Day (1994); Ettlie (1997); Handfield and Lawson (2007); Petersen et al. (2005)	Integrative NPPD team engaging members from the start, encompassing multiple internal functional areas as well as relevant external parties such as suppliers, customers, and logistics providers.	Functional cooperation NPPD	Concept development and product design, commercialization	NPD project performance
Wheelwright S. C., Clark K. B. (1992)	New Product Introduction (NPI) process is arguably the most significant key business process, which, if executed effectively and with passion, can capture the commitment, innovation, and creativity of the whole organization.	Joint involvement of NPI stages	Market analysis, decision making, planning, development, testing, implementation	NPI effectiveness and efficiency
Reinertson D. G. (1991)	This approach to NPI is based on Phased Project Planning (PPP) where the process is divided into major phases, and monitored by rigid bureaucratic events which are based on audit principles.	Functional cooperation NPI	Business market analysis, technical development, product testing, product implementation, and commercialization	NPI project performance
Cantamessa and Montagna (2016)	The NPD process of a company is often described in an analytic model for an innovation process. NPD is a business process that a company performs to deliver	Relationships between companies	Original idea, perfect innovation	Innovative performance

Study	Definition	Approach	Stages	Outcomes
	innovation to the market.			
Ellison D. J., Clark K. B., Fujimoto T., Hyun Y. (1995)	The NPI process can be characterized into phases of activity throughout the cycle, from the concept to the start of production.	Cross-functional NPI activities	Concept study, product planning, product engineering, process engineering	NPI project performance

Sources: *Ahmad et al., 2010; Atuahene-Gima, 2005; Bergen and McLaughlin, 1988; Cantamessa et al., 2016; Day, 1994; Ellison et al., 1995; Ettlie, 1997; Faems et al., 2005; Handfield and Lawson, 2007; Knudsen, 2007; Langowitz, 1989; Partanen and Haapasalo, 2004; Petersen et al., 2005; Ryall, 2013; Sherman et al., 2000; Smith and Reinertsen, 1992; Swink and Calantone, 2004; Voss and Winch, 2009; Wheelwright and Clark, 1992*.

The initial literature search identified reviews published between the 1980s, 1990s, and in the years since 2000. The above definition matrix summarizes the reviews that concentrate specifically on different approaches to NPD and NPI processes. They served as a point of departure for further analysis. Next, individual articles were studied to glean further, more detailed information, which, in turn, allowed us to complete our own review to add to the literature database of original and previously unprocessed results for the different types and forms of new product development/introduction.

4.2 Characteristics of Process Elements

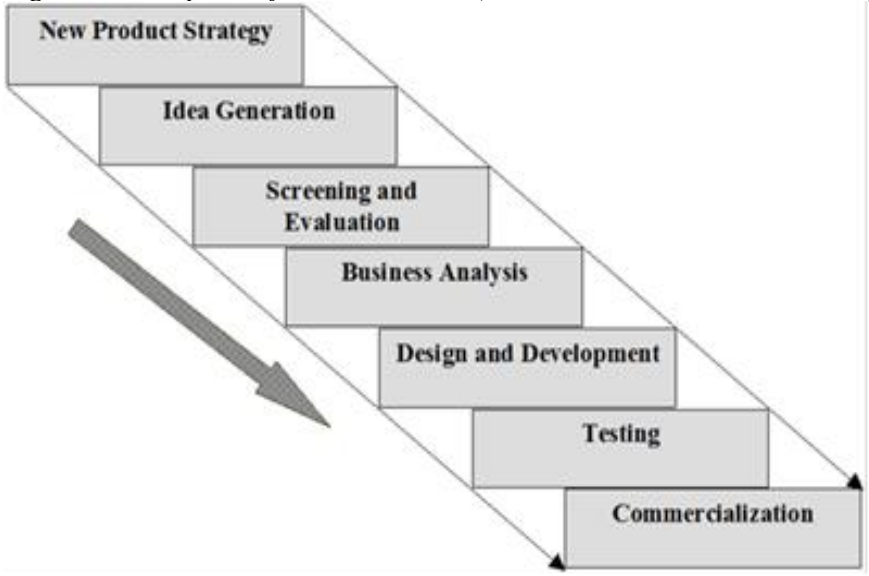
There are many useful models to show communication linkages and enhance understanding of the process, the most common of which are: Departmental-stage models, Activity-stage models, and Decision-stage models (Parry *et al.,* 2008; Saren 1984). Booz, Allen and Hamilton's (1982) model, also called the BAH model shown in Figure 2, is the best known one. Under this model, a new product evolves over a sequence of steps, starting with an initial product concept or an idea which is then assessed, developed, tested, and launched in the market (Booz, 1982).

5. Contractual New Product Introduction (CNPI): A Conceptual Model

New product development is about bringing the right product to the right customer at the right time and price, beating off the competitors and counteroffers. That is a typical and proper purpose for manufacturing organizations to meet market demands and make end customers satisfied.

For an outsourcing company which provides the service of introducing new products on behalf of the customer who takes the role of a new product initiator, the purpose is somewhat different. The service provider is under obligation to meet the needs of the customer and to manage all customer projects by providing cross-discipline interface to all facets of project execution.

Figure 2. *A snapshot of the BAH model (Booz, Allen, and Hamilton, 1982)*



Source: *Booz, Allen, and Hamilton, 1982.*

For the service provider, product life cycle management is a process of coordinating the entire life cycle of a product, service, or a solution from customer identification through solution creation, development, manufacturing, provision of services, and post-life recycling.

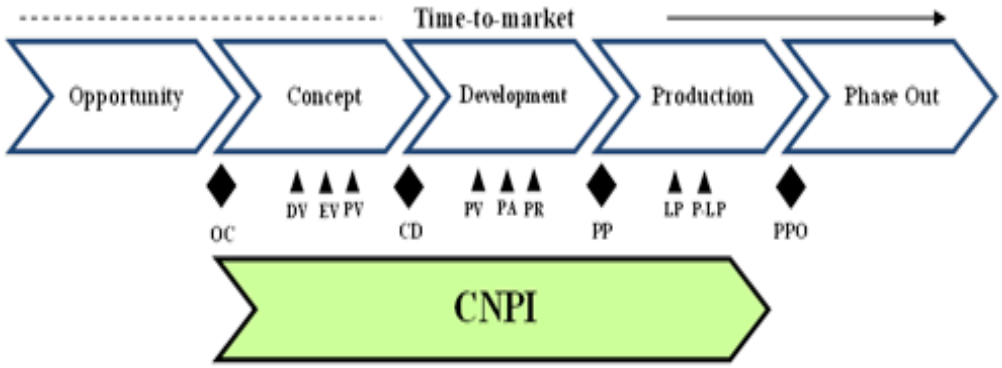
It is suitable for all business types and provides a consistent company-wide framework for integrating, distributing, and improving best practices that drive customer-focused value, proactive initiatives, and transform company ideals into daily activities.

The product life cycle, encompassing five sequential phases and their objectives, is presented in Figure 3. The framework is flexible, which means that projects can enter at any point provided that the requirements for prior gates have been satisfied.

Opportunity Assessment is the first phase. Its goal is to assess and select opportunities consistent with the company strategy. These opportunities become partnerships in the next phase, namely Concept, where customer requirements are clarified.

Development and Production Phases are the two phases to follow. They are essential for the development and production of solutions that deliver customer value. Phase Out is the final phase, focused on end-of-life support.

Figure 3. *CNPI in the product life cycle*



Source: *Author's collaboration.*

The starting point for the process of contractual new product introduction is also flexible. Typically, it begins at the Opportunity – Concept (OC) gate, where customer requirements are shared with the NPI project lead to start building a project team and implementation plan. The NPI Team remains fully engaged throughout the Concept and Development phases. All supporting disciplines should be clearly defined and need to interact to ensure that the milestones set for each of them are achieved.

In this study, contractual new product introduction (CNPI) is defined as an integrated process involving the customer and the service provider, where the product is introduced for the first time at the service provider site and may or may not require engineering verification (EV) or design validation (DV), and prototype building.

From there, the product goes through the process validation (PV), product approval (PA), and product release (PR) gates before a smooth transition to production. CNPI may start earlier, in the Concept phase, or it may start later, in Development, depending on the project scope and guidelines; nonetheless, the requirements for the previous gates must be met.

The contractual new product introduction process involves many activities, from concept design and physical design to pilot production ramp support, as illustrated in Figure 4. In view of specific requirements, companies may introduce additional procedures to clarify additional details associated with the engaged disciplines, to meet customer requirements or particular conditions for CNPI.

Figure 4 also provides a CNPI process management model. The model shows CNPI as a phase-gate process, from concept design to production launch, with the customer and all disciplines required for its completion fully engaged throughout all phases.

Phase gates are checkpoints in CNPI where outputs are assessed based on specific criteria. They are control points to monitor progress in the CNPI process.

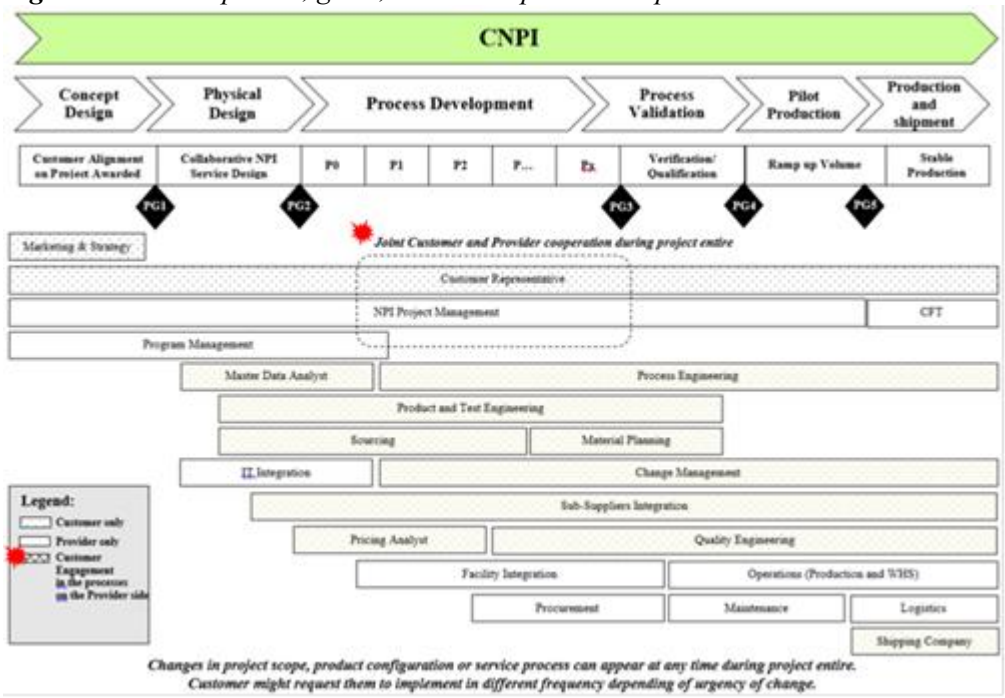
1. **PG 1 – Customer Alignment:** Identify NPI service level or project scope; Identify product design and engineering opportunities; Identify NPI material acquisition plans**;** Obtain preliminary documentation**;** Establish and review the NPI implementation plan**;** Start a preliminary RFQ**;** Reach pricing agreement with the customer
2. **PG 2 – Qualification and Planning:** NPI service level aligned prior to an estimated budget calculation**;** Project plan, team selection, and project scope**;** Kick-off engineering activities**;** Prepare for prototyping, if required; Establish an early plan and set of assumptions to drive the product through the launch cycle
3. **PG 3 – Update and Progress:** BOM structure finalized**;** Production process flow finalized**;** Material and handling finalized**;** ECO updated**;** Assess customer product design and BOM stability as well as manufacturing and test processes**;** Test processes completed**;** Production level tooling and equipment**;** Any design, process development, or build schedule changes identified
4. **PG 4 – Verification and Risk Assessment:** this is the most critical phase gate and proper review should address all issues related to pilot performance and mass production readiness**;** BOM verification – service provider BOM vs customer BOM**;** Production tooling and equipment in place**;** Remaining EC activity**;** Assess readiness for volume ramp-up
5. **PG 5 – Pilot Production Assessment (Production Performance Review):** Mass production process performance**;** Sufficient quantity of units completed to assess quality and delivery performance**;** Production throughput**;** New issue discovery**;** Validation and PSW signed off with the customer**;** Launch lessons learned**;** Customer feedback and corrective actions.

Customer involvement in CNPI plays a critical role throughout the entire process. Service providers should strive to engage customers in the value exchange process, and ultimately treat them as partners.

For companies in the service sector, customers' positive perception of the their services bears heavily on their future relations in the supply chain when they seek to acquire new projects. It is also crucial for service providers to build all activities upon the initial customer trust, since the customer controls project administration during the implementation.

Table 5 shows the primary stakeholders in CNPI. The customer basically seeks to hire a provider with leading technology and processes to launch their product ahead of market demand. Considering the uniqueness of the product and the importance of the agreed launch time, the provider with the relevant disciplines is responsible for coordinating a multi-organizational NPI Project Team and external stakeholders.

Figure 4. *Process phases, gates, and development disciplines in CNPI*



Source: *Author's collaboration.*

The NPI Project Manager informs the customer about the timeline of key deliverables to meet prototype and pilot build deadlines. The contract is made in writing and is archived for future reference once it has been signed by the customer.

Previous studies concerned with customer involvement focused on management information systems or total quality management issues. Currently, customer involvement in new product or service development and introduction processes is emerging as a new area of research (Alam, 2002). According to the available publications, companies in the service sector have insufficient understanding of the significance of customer involvement in new service development processes (Alam and Perry, 2002; Horne, 1995; Matthing *et al.*, 2004).

Table 5. *CNPI participants*

Participant	Expertise in	Selected by
CUSTOMER	**Idea Generation** Marketing and Strategy Business Development **Recruit a provider**	*Project Initiator*
PROVIDER	**Central Project Management** **Quality Management** **Product Engineering** **Process Engineering**	CUSTOMER

	Testing and Prototyping Logistics systems Supply chain processes **Any other processes required to launch a new product**	
SUPPLIER	Material and components producers	CUSTOMER
SUPPLIER	Material and components producers	PROVIDER
SHIPPING COMPANY	International shipping	CUSTOMER

Source: *Author's collaboration.*

Each CNPI requires structured activities that facilitate control and adequate resource expenditure, as well as unstructured activities (e.g. improvised engineers' meetings) that promote creativity and collaboration (Swink, 2006). Coordination by feedback is a managerial structure which takes advantage of the project manager's authority to ensure flexibility while maintaining control over the results (Hong *et al.*, 2009).

The project manager, previously recognized as the provider, requires assistance from appropriate sub-suppliers involved in the project to procure materials or components needed to build a new product. When the approach proposed in this study is followed, sub-suppliers hired for the project are fully involved early on in the regular meetings with the customer and the provider to ensure that project schedule, budget, and quality objectives are met.

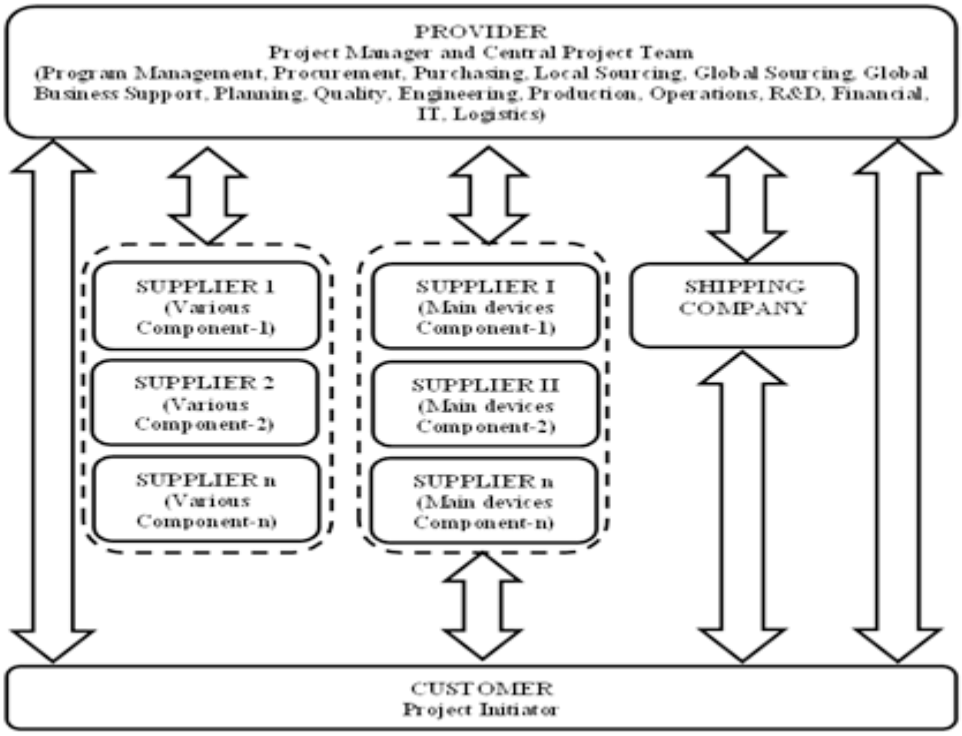
Figure 5 illustrates a general project configuration in CNPI. Effective communication, once the key players are in place, is vital for the success of the project. The project manager and central project team manage overall coordination; nevertheless, it is the customer who takes decisions concerning changes in the time schedule, cost, product structure, etc. Collecting feedback from the customer and other stakeholders, e.g., sub-suppliers, on a regular basis is critical.

Therefore, regular meetings, e-mail updates, notifications via communication platforms, etc. should be scheduled. Clear and exhaustive documentation prevents misunderstandings between collaborators, provides direction for managing future relations, and minimizes miscommunication between the parties.

All processes, from sub-processes to the primary process, need to be documented in detail leaving no room for ambiguity. A broad range of documentation not only supports close communication between the stakeholders but also facilitates resolution of disagreements that are likely to occur (Cleland and Gareis, 2006).

Smooth transfer is essential for successful outsourcing of an NPI project. Sometimes involvement of many stakeholders complicates it and renders it vulnerable. When changes occur, every stakeholder is mostly concerned with their own situation (Cleland and Gareis, 2006).

Figure 5. *Main relationships in CNPI*



Source: *Author's collaboration.*

As soon as the supplier comes into play, the transfer of operations needs to be announced to everyone who takes part in the project to avoid a situation where service levels deteriorate as a result of inadequate communication regarding the structural changes under implementation. The provider is responsible for the performance and communication between all parties to ensure that everything is done correctly and efficiently.

6. Discussion

The results of the literature review together with the conceptual model provide valuable insights into the significance of customer engagement, the phase-gate process model, and key stakeholder linkages as the key factors in CNPI in the context of close collaboration between the customer and the service provider.

Drawing on the literature review and process characteristics, it is possible to further discuss these relationships and to expand the CNPI framework to address critical success factors.

Service providers may struggle to perform well due to a paucity of practical guidelines in the literature concerning contractual new product introduction.

Although NPD and NPI in manufacturing have advanced over the years due to improved practices, this study shows that practical aspects of CNPI intended to assure that new product development/introduction is successful have not been sufficiently discussed in the literature. Consequently, product performance is suboptimal and adoption levels with respect to the collaboration between the customer and the service provider are low.

Well-established processes and best practices adopted for product development in manufacturing influence product reception, its use, and overall market penetration. However, applying the same practices in CNPI would be misguided because correlations in the core processes are different and relationships between the stakeholders greatly impact the success of the launch.

Accordingly, if the service provider adopts and adheres to NPD or NPI practices from the manufacturing environment only, CNPI will underdeliver. The importance of the selected aspects in NPD, NPI and CNPI is presented in Table 6. There is evidence that CNPI services need to be properly designed and aligned with varying customer needs and requirements. A detailed process map should include critical success factors and provide an explanation of the key processes offered by the service provider.

To address these concerns service providers are required to reconfigure their NPI processes and commit competent project teams capable of developing high-quality services that meet customer requirements. Provided that an appropriate set of selected critical factors are taken into account, contractual new product introduction will deliver the results expected by the customer, the service provider, and other stakeholders.

The principal aspects of CNPI are emphasized in Table 6. They require further analysis if they are to lead to the development of NPI services which are customer-oriented, generally adopted, trusted by customers, and which comply with customer requirements and external regulations.

Clearly, there are many other aspects that could be considered in such analysis, however those listed below provide the most convincing picture of the significance of CNPI elements compared to NPD and NPI.

This paper contributes to scientific knowledge by providing a systematic synopsis of the body of NPD and NPI literature from the 1980s through 2021 and by integrating the perspective of the process participants.

The literature review was particularly useful in the development of the proposed conceptual framework that allows one to become acquainted with and to understand the underpinning of the CNPI process, its phases, gates, applicable practices, barriers, and enablers for internal and external stakeholders.

***Table 6**. Significance of selected aspects in NPD, NPI and CNPI*

Aspects	**NPD**	**NPI**	**CNPI**
The organizational structure of the project	+	++	+++
The purpose and scope of the project	++	++	+++
Communication	+	+	+++
Top management involvement	+	+	++
Customer empathy and ideation	+	+	+++
Staff turnover	+	++	++
Project schedule	+	+	+++
Project cost management	++	+++	+++
Requirement analysis	+	+	+++
Business case formulation	+	+	+++
Project resources	+	+	++
Testing and prototyping	++	++	+++
Product impact assessment	++	++	+
Product strategy	+++	+++	+
Reporting	+	+	+++
Change management	+	++	+++
Risk assessment	++	++	+++
Relationships between participants	+	+	+++
Knowledge Management	+	++	+++
Project Management	+	+	+++
Quality management	++	++	+++
Product management	++	++	+++
Material management	+	+	+++
Time management	+	+	+++
Establishing the business value of the project	++	++	+++
Understanding the project	+	+	+++
Project Manager, Project Team, and Project Initiator	+	+	+++

***Notes:** '+' low significance; '++' medium significance; '+++' high significance*
***Source:** Author's collaboration.*

The proposed CNPI model can be used by organizations operating in many different industries, e.g. cosmetics industry, electronics industry or private-label manufacturing for retailers, where close relations between the customer and the contractor are salient. These relations, resting on close collaboration between the

parties, require specialized software and logistics solutions for CNPI-specific process elements.

Further research should focus on the identification of resources required for successful CNPI from the standpoint of the customer and the service provider. Also worth further investigation are the benefits and advantages that the customer and the service providers should be able to derive from applying the approach advanced in this study.

7. Conclusions

The following conclusions have been drawn following the examination of the available literature. The process of contractual new product introduction in outsourcing organizations is different from the process of new product development in manufacturing organizations. Applying NPD principles to NPI is valuable; however, it requires an extension of the model to incorporate cooperation of all disciplines engaged in the process and participation of customers in decision-making.

This paper proposes a specific approach to NPI which spotlights a collaborative relation between the customer and the provider. It promotes a better understanding of the complexity of the process and captures communication streams in each phase throughout the process.

For the process of outsourcing NPI to proceed effectively, the relations that hold between the participants from different levels in the organizational structure need to be properly defined. Establishing trust and ensuring effective communication between them throughout the project is paramount.

This work contributes to reducing a theoretical gap by offering in-depth exploration and analysis of contractual new product development management. It paves the way for further research which should concentrate on critical success factors to find out how outsourcing organizations could improve their performance when introducing new products on behalf of their customers.

Based on the findings of this study, it can be concluded that there are important elements in the process that need to be taken into account for proper process design. For example, the change management process is central to CNPI and requires further mapping from the perspective of one of the major sub-processes in the overall CNPI.

The conceptual framework proposed in this paper suggests directions for further research on its application and adaptation to contractual new product introduction that would demonstrate the benefits its brings to both the customer and the contractor.

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Abbreviations

BOM	Bill of Material
CD	Concept-Development Phase
CFT	Customer Focus Team
CNPI	Contractual New Product Introduction
DV	Design Validation
ECO	Engineering Change Order
EV	Engineering Verification
LP	Launch Production
NPD	New Product Development
NPDI	New Product Development Introduction
NPI	New Product Introduction
NPPD	New Product Process Development
OC	Opportunity-Concept Phase
PA	Product Approval
P-LP	Post Launch Production
PP	Pilot Production
PPO	Production Phase Out
PR	Product Release
PSW	Part Warranty Submission
PV	Process Validation
RFQ	Request for Quotation