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# Customer Feedback and Data Collection Techniques in Software R&D: A literature review

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**Abstract.** In many companies, product management struggles in getting accurate customer feedback. Often, validation and confirmation of functionality with customers takes place only after the product has been deployed, and there are no mechanisms that help product managers to continuously learn from customers. Although there are techniques available for collecting customer feedback, these are typically not applied as part of a continuous feedback loop. As a result, the selection and prioritization of features becomes far from optimal, and product deviates from what the customers need. In this paper, we present a literature review of currently recognized techniques for collecting customer feedback. We develop a model in which we categorize the techniques according to their characteristics. The purpose of this literature review is to provide an overview of current software engineering research in this area and to better understand the different techniques that are used for collecting customer feedback.

**Keywords:** Customer feedback, data collection, the ‘open loop’ problem, qualitative feedback, quantitative data.

## 1 Introduction

Although the opportunities to learn about customers and customer behaviors are increasing, most software development companies experience the road mapping and requirements prioritization process of features as complex. Product management often finds it difficult to get timely and accurate feedback from customers [2], [20]. Typically, feedback loops are slow and there is a lack of mechanisms that allow for efficient collection and analysis of customer feedback [1], [2]. Usually, confirmation of the correctness of product management decisions takes place only after the finalized product has been deployed to customers, and when there is little opportunity to adapt to changes. In previous research, we coined the term the ‘open loop’ problem, referring to the challenges for product management to receive accurate customer feedback to use as a basis in their decision-making processes [2]. Despite the availability of sophisticated customer feedback techniques, our research shows

that these are still difficult to apply in a way that improve decision-making processes in software R&D. As a result, and despite that significant data is being collected, companies have insufficient knowledge about how their products are used and what features the customers actually appreciate and desire to use in the future. This means that there is typically a weak link between customer data and product management decisions, and no accurate way in which the organizations can assess whether the features that were prioritized during the road mapping process are also the features that are appreciated and used by customers and that generate revenue to the company [4], [17].

In the context of this, we conduct a literature review in the area of customer feedback and data collection techniques. In our review, we let the basic principles of the systematic literature review method guide us [5], and we adopt a structured approach to literature search and selection. The purpose of our review is to provide an overview of current software engineering research in this area and to better understand the different techniques that are used for collecting customer feedback in different stages of the software development process. We summarize our findings in a model in which we categorize all customer feedback and data collection techniques, as well as present in what stages of the development process they are typically used. While this topic has been carefully studied within research domains such as e.g. information systems (IS), human computer interaction (HCI) and management literature, it has not been widely recognized in the software engineering (SE) domain [31].

The contribution of the paper is twofold. First, we provide a ‘state-of-the-art’ overview of software engineering research within the area of customer feedback and data collection techniques. While the attention for this topic is gaining increasing interest also in the software engineering research community, there is no literature review that provides an overview of the research reported in this community. Second, we present a structured model that provides an overall understanding for existing feedback and data collection techniques, and that works as a support for selecting the appropriate feedback technique in a specific stage of the software development process.

The remaining of this paper is structured as follows. In section 2 we present the background and the motivation for this study. In section 3, we describe the systematic literature review (SLR) method from which we use the basic principles when collecting the papers. In section 4, we present the results from the literature review. In section 5, we discuss the results and we present a model in which we categorize the techniques according to their main characteristics and map them to the development stages in which they are typically used. Finally, in section 6, we present the conclusions.

## **2 Background**

Software development in general, and how to involve and learn from customers in particular, has been a topic of intensive research for a long time [25], [38]. Recently, and as a means to solve the many challenges with how to involve customers, many

companies have adopted agile development methods. For more than a decade, agile development methods have demonstrated their success in establishing flexible development processes with short feedback loops and consideration taken to evolving customer needs [1], [11]. However, and as recognized in this paper, despite recent methods and sophisticated techniques, there still exist major problems in how to learn from customers, i.e. how to efficiently collect customer feedback and customer data. In our previous research, we described this situation as the ‘open loop’ problem referring to a situation in which product management has difficulty in getting access to customer feedback that can help them in e.g. feature prioritization processes [2]. In related research, similar problems have been identified [34], [36] and many are those that look for the ‘silver bullet’ that will help solving the issue with how to best involve customers, and learn from their feedback.

The issue of how to involve customers and how to collect customer feedback has gained much attention and is a well-established topic within research traditions such as e.g. information systems (IS), human computer interaction (HCI) and participatory design (PD). In information systems research, it has been a prominent research topic for decades, with a special focus on the organizational and social contexts that influence customers and customer behaviors [31], [32]. In human computer interaction research, as well as in participatory design research, the focus is primarily on methods, activities and distinct techniques for improving usefulness, ease of use and user satisfaction [34], [35]. Also, the innovation management literature provides interesting insights in the area of customer involvement and feedback techniques. In a recent paper, Bosch-Sijtsema and Bosch [4] present a model in which they identify a number of customer involvement techniques in high-tech firms, and they categorize these according to what type of data that is collected, to what extent customers are actively or passively involved in data collection, and in what stage of the development process the technique is typically used.

However, although of critical relevance for any software development process, the topic has not gained much attention in the software engineering (SE) research domain. While there is significant research on e.g. requirements engineering and elicitation [3] techniques, there are few studies that recognize the many additional opportunities that exist to involve and learn from customers during the development process. Therefore, and as a way to assess the current ‘state-of-the-art’ in software engineering research, we conduct a literature review focusing on customer feedback and data collection techniques. In the best of our knowledge, such a literature review has not been conducted in the SE domain before and hence, our review addresses a gap at the same time as it creates a better understanding of recent software engineering research with relevance for this particular topic of interest.

### **3 Method**

This literature review is our first step towards conducting a ‘Systematic Literature Review’ (SLR), method presented by Kitchenham [5]. As a systematic approach to searching, selecting and reviewing papers, this method provided us with a basic structure for identifying recent research with relevance for exploring our research

questions. As their main characteristic, systematic literature reviews are formally planned and methodically executed. Initially developed in medicine, the method has been widely adopted in other disciplines such as criminology, social policy and economics, and recently it has gained momentum also in research domains such as e.g. information systems and software engineering [27], [28]. The purpose of our literature review is to provide an overview of recent software engineering research in the area of customer feedback and data collection techniques. In our overview, we address the following research questions:

- *RQ1*. What are the existing customer feedback techniques as reported in software engineering literature?
- *RQ2*. What are the existing customer data collection techniques as reported in the software engineering literature?
- *RQ3*. In what stages of the development process are the identified techniques used?
- *RQ4*. What are the main challenges and limitations of the identified techniques?

## **2.2 Search process**

In our search process, and in order to provide a ‘state-of-the-art’ review of customer feedback techniques in the software engineering research domain, we selected the highest ranked software engineering journals. Our search process started with selecting relevant terms such as ‘customer feedback’, ‘customer involvement’, ‘customer participation’, and continuing with ‘data collection’ and ‘customer data’ in order to also target non-physical collection of feedback. The journals that were included in our search process are the top ten software engineering journals, namely IEEE Transactions on Software Engineering (TSE), Communications of the ACM (CACM), Springer Empirical Software Engineering, IEEE Computer, IEEE Software, ACM Transactions on Software Engineering and Methodology, MIS Quarterly, Empirical Software Engineering, Information and Software Technology, SW Maintenance & Evolution - Research & Practice and databases [30]. In addition, we used the same queries to search for conference papers in the library of the Institute of Electrical and Electronics Engineers (IEEE), ACM, Science Direct, Scopus and on Google Scholar.

## **2.3 Inclusion and exclusion criteria**

Each paper that matched the search criteria was reviewed by at least one of the researchers, and as suggested by the SLR [5], we reviewed the keywords, we read the abstract and we identified customer feedback and data collection techniques in the body of the paper. We selected the papers that recognize at least one technique for customer feedback and data collection with the purpose to use this data to improve and innovate software products, e.g. develop a new feature or a new product. In our review, we included papers where customer feedback techniques were the main

purpose of the paper, as well as papers where such techniques were only one element of the paper.

## **2.4 Data collection**

The data extracted from each study were:

- The source (conference or a journal name)
- Classification of the study Type (customer involvement, customer data collection, new product innovation)
- Summary with main focus of the paper
- Main findings of the paper
- Main challenges

## **2.5 Results**

This section summarizes the results of our literature search process. Although there were about 147 different papers that initially matched the search criteria entered in the search engines of the individual journals and conferences, we found only 13 papers with direct relevance to the research questions we specified. These were the papers that mentioned at least one method of customer feedback in the abstract or in the body of the paper. We present the papers that we collectively selected in Table 1.

**Table 1.** Software engineering papers that were selected as relevant for our literature review on customer feedback and data collection techniques.

ID	Authors	Title of the publication	Date	Topic Area
P1	Kabbedijk et al	Customer Involvement in Requirements Management: Lessons from Mass Market Software Development	2009	Customer involvement
P2	Chen et al.	A novel virtual design platform for product innovation through customer involvement	2011	Customer involvement
P3	Chen et al.	How customer involvement enhances innovation performance: The moderating effect of appropriability	2014	Customer involvement
P4	Wang	Facilitating customer involvement into the decision making process of concept generation and concept evaluation for new product development	2012	Customer involvement
P5	Burns and Halliburton	Tackling productivity and quality through customer involvement and software technology	1989	Customer Involvement
P6	Cohan	Successful Customer Collaboration Resulting in the Right Product for the End User	2008	Customer participation
P7	Martin et al.	XP Customer Practices: A Grounded Theory	2009	Customer Involvement
P8	Jin et al.	New Service Development Success Factors: a Managerial Perspective	2010	Customer Involvement
P9	IEE Colloquium	IEE Colloquium on `Customer Driven Quality in Product Design' (Digest No.1994/086)	1994	Customer data
P10	Yang and Chen	Customer Participation: Co-Creating Knowledge with Customers	2008	Customer Participation
P11	Bhatia et al.	Monitoring and analyzing customer feedback through social media platforms for identifying and remedying customer problems	2013	Data Collection
P12	Pang et al.	Opinion mining and sentiment analysis	2008	Customer data
P13	Bosch	Building products as innovation experiment systems	2012	Customer data

## 4 Results

In accordance to the research questions (RQ 1-4), we present the existing customer feedback and data collection techniques, in what stages of the development process they are used, what characteristics they have, and what challenges and limitations that are associated with the techniques.

#### 4.1 Customer feedback techniques

Most often, and as recognized in several of the papers we found, the initial source of customer feedback originates from direct interaction with the customer by using techniques based on active customer involvement [6], [7]. Typically, feedback is collected using techniques such as customer interviews, customer questionnaires and customer surveys. As recognized by Yiyi et al. [7], customer questionnaires and surveys are given to customers to have them express an idea or an opinion, in order to provide the company with a basic understanding of their needs and desires, as well as their expectations of the product. Also, and as suggested by Olsson & Bosch [25], observation of customers is a common technique to learn about their behaviors. This technique allows for follow-up questions on certain behaviors that were identified during the observation. As a more interactive approach, Kabbedijk et al. [6] suggest having ‘theater sessions’ together with several customers to have them express e.g. a feature request and provide input on how a certain feature would be used in their context.

Also, and as one of the most common techniques, the evaluation of prototypes is conducted in close collaboration with customers [26]. Sampson et al. [9] suggest rounds of prototype testing in which feedback is collected to support developers on a continuous basis. Such testing and evaluation activities can be internal and include developers that built the product, as well as external including beta users that agree to try the product for a limited period of time. Martin et al. [14] support the idea of having internal evaluation with developers being the first “customers”, and suggest a second step in which developers coach the customers for a couple of iterations. This way, the product use is observed by its’ creators while in use by the customer. As a result of this, the developers collect information about customers’ experience of the product and spot issues that might not have been revealed differently. Additionally, and when having a prototype or an early version of a product, in-product surveys and web polls are important techniques for collecting feedback that helps in understanding the customer appreciation of a current and future products. Martin et al. [14] also recommend customer pairing and customer ‘boot camps’ as one technique to not only collect feedback from one customer, but to have customers share this feedback with other customers with similar experiences.

Burns and Halliburton [12] suggest continuous customer review of products, and customer involvements that concludes with an approval or a rejection of an idea or product concept. In their experience, operational ‘walk-throughs’, i.e. end-to-end tests by various customer groups should be presented to the customer, and that developers should be the first “customers” of the product. In similar, Cohan et al. [13] note that for a successful project, the customers should provide feedback on a continuous basis, and that several iterations in which the minimal product functionalities are evaluated is a beneficial way of ensuring the collection of accurate customer feedback and in a timely manner. Jin et al. [15] confirm this when recognizing that the higher the customer’s involvement is, the higher the success rate will be for the product that is being developed. Finally, and as identified by Bosch [17], customer interest can also be measured by a method known as ‘BASES’ testing. The method was originally introduced by Nielsen [8] and measures customer interest in new product concepts in order to identify the potential of a new product or improvement of an existing one.

## 4.2 Data collection techniques

As a result of products being increasingly software-intensive, and with the opportunity to have these products connected to the Internet, companies are experiencing novel opportunities to learn about customer and product behaviours. As products go on-line, companies can monitor them, collect data on how they perform, predict when they break, know where they are located, and learn about when and how they are used or not used by customers. Typically, this form of customer and product data collection takes place when the products have been deployed and being used in real-time by its customers. In this context, Chen et al. [16] recommend to collect both customer data, e.g. demographic, psychographic, and behavioral data, as well as product data, e.g. operation, performance, responsiveness. This data can be used to generate models of product use and customer behaviors as a basis in direct interactions with customers. For example, product data reveals what features are used, how often they are used, and what point in time they are used etc., and can be used as a means for having customers rank individual features and this way directly steer product development [6].

Bosch [17] describes several techniques for customer data collection. He suggests advertising new products via online ads and having in-product surveys to identify potential interest in new products. Also, he notes that some companies display different versions of the same product or feature to customers, and have mechanisms in place to collect data on how customers respond to these different versions. In this way, companies learn about what is the preferred version of the product. This is known as A/B testing [11], and is a common data collection technique in the web 2.0 and in the software-as-a-service (SaaS) domain. Additionally, and as recognized by Kohavi et al [26], an early version of the product can be given to a sample of customers to test the functionality, where operational data, event logs and usage data are retrieved in order to identify performance issues, errors and other usability problems. Furthermore, this data can be complemented with geographical data and time zone information in order to segment the customers.

In addition to the data collection techniques above, external data sources such as social media e.g. Twitter, Instagram and Facebook consist of millions of connected customers that are located around the world and that share their experiences of products. Bathia et al. [24] recognize these data sources as increasingly important sources of information where companies can learn about customer behaviors and customer opinions [29]. Similarly to social networks, crowd-funding platforms such as Kickstarter provide a source of data that reveals products that succeeded or failed in collecting the community support.

## 4.3 Development process stages

In reviewing the selected papers, we see that different customer feedback and data collection techniques are deployed depending on what development stage the product is in. In the pre-development phase, software development companies collect customer feedback in requirements specifications, through questionnaires and surveys and by engaging customers in solution jams or theater sessions where different ideas

are proposed, ranked and discussed [6], [7]. Also, customer interest in this early stage can be investigated with techniques such as BASES testing [17].

During development, customer feedback is collected in prototyping sessions in which customers test the prototype, discuss it with the developers, and suggest modifications of e.g. a user interface [9], [26]. As a result, developers get feedback on customer behaviors and ways-of-working, as well as on product usefulness, ease of use etc. This feedback serves as important input in further improvement of the product. Additionally, in-product marketing and in-product surveys can be performed at this stage to get the feedback data about a product's version and potential interest in other features [17].

In the post-deployment stage when the product has been released to its customers, a number of techniques are used to collect customer and product data. First, and since the products are increasingly being connected to the Internet and equipped with data collection mechanisms, operational data, performance data and data revealing feature usage is collected. If customer experience problems with the product, they generate incident reports, support data, trouble tickets etc. that are important sources of information for the developers when troubleshooting and improving the product [10]. Often, and as recognized in previous research (see e.g. Bosch [17]), A/B testing is a commonly deployed technique in order to optimize an existing feature, introduce a new one or when building a new product.

#### **4.4 Challenges and limitations**

There are several challenges and limitations associated with the techniques as identified in the literature review. For example, theatre sessions, or similar requirements gathering methods, require sophisticated technology implemented at the location where the customers meet [6]. This reduces the amount of available venues for such an event. Second, the customers need to be present at the same time at the same location, which might be difficult to achieve due to tight schedules in the companies and inconvenient to handle if frictions between customers are present [6].

Questionnaires, interviews, surveys, site visits and face-to-face interaction with customers are time-consuming techniques [6], [7], and therefore challenging to make happen in a fast-moving business environment in which process efficiency is key [7], [17]. Also, our review identifies challenges and limitations associated with testing of prototypes. When presenting a prototype, only parts of the product is developed. Therefore, customers are not able to test the full product, and they might misinterpret the intention with the early version of the product. This might lead the customer to believe that the product is not developed as agreed [9], [14].

A/B testing, i.e. showing different versions of the same product to different customer groups, pose numerous challenges. For example, there might be the risk that customers that get used to one version of the product get hesitant when exposed to a different version of the same product [29], [39]. Second, customer segments need to be carefully chosen in order to prevent revenue loss in case of operational problems or product expectations that do not match with the experimental version [39].

Finally, on-line ads and in-product surveys can be experienced as disturbing by customers if not presented correctly [17]. Often, customers prefer to express their

opinions on social networks such as e.g. Twitter and Facebook etc., which produces similar outcomes as product surveys. However, social networks typically generate large amounts of data that is difficult to analyze [29].

#### 4.5 Summary of results

**Table 2.** Summary of literature review results.

<b>Customer feedback technique</b>	<b>Development stage</b>	<b>Challenges/limitations</b>	<b>Noted in paper</b>
BASES testing	Pre-development	Potential bias of panel members	P13
Interviews	Pre-development	Time consuming	P1, P10, P2, P3
Questionnaires	Pre-development	Time consuming	P1, P10
Surveys	Pre-development	Time consuming	P1, P2, P3, P4
Observations	Pre-development	Time consuming	P1, P10
Theater sessions	Pre-development	Availability of technical infrastructure, physical presence of participants in the same location	P1
Prototype testing	Development	Only partially developed interfaces and functionality	P6, P7, P8, P13
Incident Reports	Post-development	Available only after an incident	
Developers as customers	Development	Time consuming for developers	P7
Customer pairing and boot camps	Post-development	Physical presence of participants in the same location	P7
Walk-throughs	Post-development	Time consuming for developers and customers	P5
<b>Customer data collection technique</b>	<b>Development stage</b>	<b>Challenges/limitations</b>	
Online ads and in-product surveys	Pre-development	Potentially disturbing for customers	P13
Beta testing	Development	Only partially developed interfaces and functionality	
Operational and event data	Development	Security issues when such data is transmitted, potentially high amounts of data	P13, P11
A/B testing	Post-development	Potentially confusing for customers when exposed to different versions	P13
Social networks	Post-development	Numerous sources, large quantities of data for analysis	P11, P12
Crowd-funding platforms data	Pre-development	Large quantities of data for analysis	P11, P12

## 5 Discussion

The purpose of this study is to provide a ‘state-of-the-art’ review of software engineering research in the area of customer feedback and data collection techniques. In this section, we discuss the results of the review. As a structure for our analysis, we use the *qualitative* and *quantitative* categorization as suggested by Bosch-Sijtsema and Bosch [4]. In the qualitative category, we place the feedback techniques that require active participation from customers and where a smaller amount of data is collected. The quantitative category, on the other hand, represents data collection techniques where customers are only passively involved and where large amounts of data is collected. Also, we note the emerging trend of social networks as a data source for collecting customer feedback with inherent characteristics of both a qualitative and quantitative nature. Finally, we summarize our findings in a structured model that provides an overall understanding for existing feedback and data collection techniques.

### 5.1 Qualitative and quantitative feedback techniques

When analyzing the papers and the different techniques they identify, we see two main characteristics that distinguish the different techniques from each other. First, and as traditionally used as the main approach to involve customers in software development, we identify a number of *qualitative* customer feedback techniques. These are techniques that require active participation from customers, that generate a small amount of qualitative feedback, and that are typically used in the early stages of development. The strength of such qualitative research methods is its ability to provide complex textual descriptions of how people experience a given research issue. It provides information about the ‘human’ side of an issue [21]. In our case these are the methods of customer feedback that we identified in section 4.1. Second, and as a result of products being increasingly software-intensive and having connectivity capabilities, we identify a number of *quantitative* data collection techniques. These are techniques that focus on product data such as performance data, error logs and other techniques of data collection that we identified in section 4.2. With quantitative techniques the order of ‘questions’ asked does not matter, design and results are subject to statistical assumptions and they seek to confirm hypotheses rather than explore opinions [22], [23].

### 5.2 Emerging customer feedback techniques

In addition to the qualitative and quantitative techniques identified above, we see a tremendous growth and popularity of social network platforms such as Twitter, Instagram and Facebook as additional data sources for learning about customers. Interestingly, these data sources provide companies with additional opportunities to collect both qualitative feedback from individual customers expressing their experiences of the products, and quantitative data in terms of the large amounts of data that is generated and that represents a large customer base. Data retrieved from

these networks is used to improve the products, detect errors, take decisions and trigger corrective measures [37]. For example, Bhatia et al. describe a system that automatically monitors social networks such as Facebook and Twitter [24]. It analyzes the data from the platforms and triggers events that lead to corrective actions. For this purpose, platforms known as ‘sentiment monitoring systems’ help companies in collecting comments from the customers, in analyzing the data generated, and in identifying major problems and to automatically trigger corrective response actions [29], [33]. In addition to social networks, crowd-funding platforms such as Kickstarter offer an insight into which products receive support and which ones failed to succeed. Such information can be used to further improve the understanding of the market desires and needs.

### 5.3 Summary

In this paper, and based on a literature review of recent software engineering research, we identify existing customer feedback and data collection techniques. From the pre-development stage, through the development process and also after the product is deployed to customers, each of these techniques provides companies with the opportunity to collect customer and product data. In Figure 1 below, we present our findings in a structured model that works as a support for selecting the appropriate feedback technique in a specific stage of the software development process.

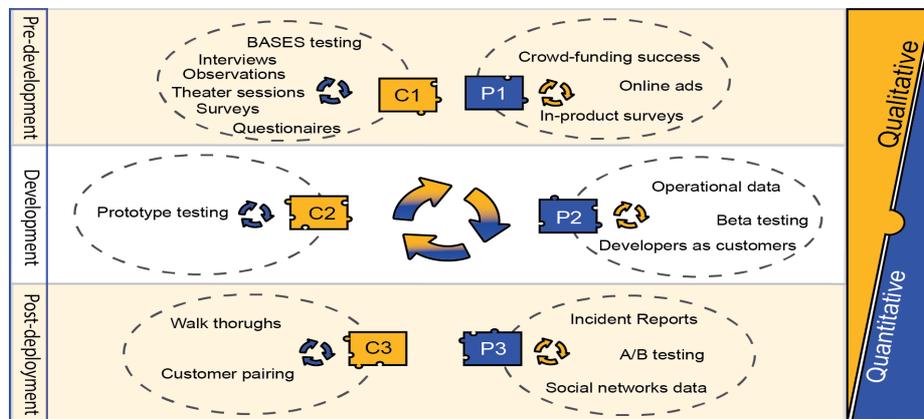


Fig. 1. Qualitative and quantitative feedback techniques.

In our model, we distinguish between three development stages, i.e. pre-development, development and post-deployment. Although we recognize that this is a simplified view, and that most development processes are of an iterative nature, we define these stages as they typically involve different techniques for collecting customer feedback. First, and as shown in the pre-development phase in the model, companies aim at identifying market interest in a new product. They interview customers, they observe them while using the products, and they might even meet with them in theatre sessions to learn more about their preferences. This first iterative

loop to learn about customers is defined with ‘C1’ in the model, with ‘C’ denoting ‘customer’ and ‘1’ the first loop of data collection. This process usually takes several iterations and generates limited amounts of qualitative customer feedback such as interview notes, survey results, observation documentation etc. In parallel to this, companies use e.g. online surveys and in-product ads to collect quantitative data from a larger customer group. This parallel loop of collecting data is defined as ‘P1’ in the model, with ‘P’ denoting ‘product’ and ‘1’ the first loop of collecting data from the product in order to improve the initial understanding for product interest and use. The C1 and P1 processes feed into each other, allowing companies to learn from both qualitative and quantitative data in an early stage of the development process.

Second, and as shown in the development phase in the model, companies aim at testing and evaluating early product concepts by using techniques such as prototyping, beta testing and by collecting operational product data. In similar with the pre-development stage, these processes are referred to as ‘C2’ and ‘P2’ with ‘C2’ denoting existing techniques for customer feedback and ‘P2’ existing techniques for data collection in this second stage of development. Again, these processes run in parallel and they complement each other with qualitative and quantitative customer and product data.

Finally, and as shown in the post-deployment stage in the model, companies use techniques to learn about customer behavior and product use when the product is commercially deployed to customers. Here, the data that is being collected is transitioning from being qualitative e.g. interview notes and observation reports, to being primarily quantitative e.g. operational data, social network data and experimental data reflecting A/B testing results. As recognized in our research, the C1- C3 techniques are typically expensive, as they require physical interaction with customers. The P1-P3 techniques, on the other hand, are typically cheaper to conduct as they use automatically generated data as input. Together, the processes and the techniques outlined in the model comprise a compelling approach for companies to collect customer feedback and data throughout the product development process.

## **6 Conclusion**

To stay competitive, software companies need to continuously collect feedback and data from customers. However, although there are increasing opportunities for doing this, many companies struggle with how to learn from customers and what techniques to apply [2], [20]. In this paper, and in order to assess the current ‘state-of-the-art’ in software engineering research, we conduct a literature review focusing on customer feedback and data collection techniques. The purpose of this literature review is to provide an overview of current software engineering research in this area and to better understand the different techniques that are used for collecting customer feedback. Our research reveals a compelling set of customer feedback data collection techniques that can be used throughout the different development stages of software products. Also, we note the emerging trend of social networks as an important data source for both qualitative and quantitative data collection. We summarize our findings in a structured model that works as a support for companies when selecting the

appropriate technique. In our future work, we plan to expand this review to include closely related, and highly relevant research domains. Also, we plan to validate our model in empirical contexts in order to provide also a state-of-practice view on customer feedback and data collection techniques.

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