

# Information Consumer Experience: A Systematic Review

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**Abstract:** The experience of employees that work with information has been studied in the literature using approaches that analyze information system success (e.g., Information Management, User Experience) or employee satisfaction (e.g., Job Satisfaction, Employee Experience) as two separate problems. Therefore, there are no approaches that analyze both employee experiences and information used within the organization simultaneously. This scenario has motivated us to define a new approach based on Consumer Experience (CX), called Information Consumer Experience (ICX). In order to accomplish this objective, a systematic review was performed, including articles indexed in four databases (Scopus, Web of Sciences, ACM digital, and Science Direct) published in the last decade (from 2012 to 2022) in order to answer the following research questions: (1) What is ICX? (2) What factors influence ICX? and (3) What methods are used for ICX evaluation? We selected 127 works and analyzed various ICX-related concept definitions, research approaches, data collection, and evaluation methods. The main contribution of this review is to identify a set of definitions, approaches, and methods for ICX modeling, evaluation, and design. The results obtained have allowed us to introduce a formal definition for the ICX concept derived from the CX approach and propose future research lines to explore ICX analysis, considering the factors and methods identified in this work, as ICX can be considered a specific case of CX.

**Keywords:** information consumer experience; customer experience; information management; information sharing



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## 1. Introduction

The fourth industrial revolution and the accelerated information technology advances that modern organizations are incorporating these days [1–4] confluence into a very competitive business scenario where organizations need to gain more customers in order to survive [5]. In this scenario, Customer Experience (CX) represents an important tool for taking advantage of customers' data provided via information technologies. CX is a concept that involves customer perceptions during their interactions with a brand or company when they use any products or services provided by the company [6]. Improving CX means that companies have to work on improving every interaction point (called touchpoints) with their customers, offering the best possible satisfaction on these touchpoints. Good CX management represents an advantageous business tool for companies [5].

In the same way that a customer interacts with a company, inside an organization, employees that work with information can interact with different information products, systems, or services that are provided by the organization in order to improve their job experience. In an organization, employees from several departments, such as sales, people management, finance, operations, and executive, among others, use information in order to perform their daily work and decision-making, which are generally administrated by informatics or analytics departments. The consumption of information from employees

within an organization is composed of several information products, systems, and services, such as reporting systems for executive consumers [7], data management systems for administrative consumers [8], data analytics, extraction, and visualization services for data-analyst consumers [2,9,10], and communications services for consumers from Human Resources Departments [11], among others.

In this sense, the Information Consumer Experience (ICX) concept involves all the perceptions of organization members when they use information products, systems, and services to do their job. Proposed as an extension of CX, ICX could be seen as the analysis of the interaction between employees or departments (consumers of information, as a customer role) and the organization or information providers departments (as a company role). The use of these information products, systems, and services from information consumers could be influenced by several factors that could modify the perception of these services' quality, usability, or usefulness. The factors that could influence ICX can be related to external factors, such as social relationships with other employees [12] or friendship opportunities [13] at work. Other factors can be related to organizational protocols for information access or usage [14], which could impact an information consumer's behavior also. Most important are the information consumer's internal factors, such as stress [15] or resistance behavior [16], which are important factors during the analysis and evaluation of the information consumer's needs, pains, and gains (experiences) when they are using an (or more) information system or information service. In this context, every information product, system, and service offered by the organization represents a source of potential interaction points (called touchpoints in the CX domain) with their information consumers since they access them in their work tasks. Studies related to information systems success [17] and user experience [18] have been addressed in the literature, focusing on the evaluation of user satisfaction using only one information system. Meanwhile, in organizational working scenarios, there are several simultaneous interactions between information consumers with multiple information systems, products, or services that these approaches cannot tackle.

In this work, we performed a systematic literature review of studies published in the last decade, selecting papers from 2011 to April 2022 in order to identify ICX-related concept approaches and analysis methods. The selection of studies was focused on the consumption of information within organizations related to information extraction, application, and sharing tasks performed by information consumers (members of the organization). We performed a search of studies in four of the largest databases in the literature, including Scopus, Web of Science, Science Direct, and ACM Digital Library. Then, after applying a set of inclusion and exclusion criteria, 127 studies were selected for an extended review. Our results show that the consumption of information within the organization has been studied using several approaches, which address a specific component of this phenomenon (i.e., employee experiences, UX, job satisfaction, information sharing, and technology acceptance model, among others) and applies specific evaluation and analysis methods for each approach. As most of these approaches and concepts associated do not cover a holistic view of the ICX concept, we propose our own definition. This review has helped us identify influencing factors present in the literature, which could modify information consumers' perceptions during their work in an organization. Further, with this review, we were able to identify state-of-the-art methods that can be used to evaluate ICX.

## 2. Background

### 2.1. User Experience

The User Experience (UX) approach studies the subjective perceptions of a person (user) when they use a specific system or service in a certain scenario (i.e., work activities within an organization or controlled experimental scenarios) [19]. These perceptions include users' emotions, expectations, responses, and behaviors while performing a specific task before, during, and after they used one product, system, or service. In this sense, UX is formally defined in the ISO standard 9241-210 [19] as: "person's perceptions and

responses resulting from the use and/or anticipated use of a product, system or service". UX is related to Customer Experience (CX) as both study user or customer perceptions, but their scopes are different; where UX studies user interaction with one only service, CX studies customer interactions with one or more services offered by a company or brand. Therefore, CX can be considered an extension of UX, as it extends the definition of a user to a customer that can interact with all the products, systems, and services provided by the brand. As UX has been widely used to study information products, systems, and services usage, in this work, we see information consumers as an extended definition of a user, as information consumers can interact with several services at the same time.

## 2.2. Customer Experience

Despite the popularity of the Customer Experience (CX) approach in the literature, there is not a standardized definition yet. As a complex concept, authors have given different definitions of CX in the literature, but the most accepted definition of CX refers to a customer's perception produced by their interactions with any product, system, and service provided by a brand [20]. These perceptions have been classified into six dimensions [21]. (1) An Emotional Dimension that involves customer feelings, (2) a Sensorial Dimension related to the stimulation of customer senses, (3) a Cognitive Dimension associated with the customer's thinking processes, (4) a Pragmatic Dimension related to accomplishing a specific task, (5) a Lifestyle Dimension that involves customers beliefs and values, (6) and a Relational Dimension related to the customer relationships with other people. All these kinds of interactions have been called touchpoints [22]. A set of touchpoints can describe a journey followed by the customer (Customer Journey) based on a set of interactions produced before, during, and after the consumption of any brand product, system, or service. In this work, we define the ICX concept as an extension of the CX concept, where information consumers differ from customers based on the scope of the products or services with which they can interact. Therefore, information consumers can only interact with information products, systems, or services, meanwhile, customers can interact with any kind of product, system, and service.

## 2.3. Information Consumer Experience

The Information Consumer Experience (ICX) involves all the interactions between employees (consumers) and information products, systems, and services inside an organization, including tasks such as information usage, information generation, inter-department information sharing, team-work, and decision-making. All these interactions represent touchpoints between information consumer employees or departments and the information provider departments inside an organization. Therefore, ICX can be considered a particular instance of the CX concept, and this can be addressed by using analytical methods from the CX domain in order to understand the ICX within an organization, identify different consumers interactions with information systems or services, and maybe represent ICX using well-known CX techniques, such as Customer Journey Map, and evaluate ICX using adapted CX evaluation techniques, such as SERVQUAL.

## 3. Research Method

This review has been performed following the framework proposed by Kitchenham [23] for literature reviews applied in software engineering domains. This framework includes three stages. Planification: Previous to performing the review, the need for the review must be identified. Then, the research questions must be defined, and the review protocol/strategy must be developed. Conduction: Once the planification review is performed, in this second stage, the data extraction and article selection based on previously specified inclusion/exclusion criteria is performed. Reporting Results: finally, the results obtained from the Conduction stage must be presented and discussed.

In order to ensure that this review has been performed following state-of-the-art standards, our research has been based on the PRISMA methodology [24], which has been

widely used in systematic review studies in the literature. PRISMA has been designed to define a formal process to perform systematic reviews and its activity's fulfillment have been considered quality gates in systematic review studies. Therefore, the PRISMA methodology has allowed us to improve our research process, including studies search, studies selection, and results analysis activities involved in our systematic review.

### 3.1. Research Questions

The main objective of this review is to search for the Information Consumer Experience (ICX) concept or associated concepts in recent works in the literature, reviewing (1) ICX definitions and its components, (2) factors influencing ICX, and (3) methods for ICX evaluation. The research questions (RQ) that guided this systematic review are presented in Table 1. The research objectives of this work are related to the research questions, which are (1) Identify approaches and definitions related to ICX, (2) Identify consumers, working scenarios, or organizational characteristics that could influence the experience of information consumers, and (3) identify methods that could be useful for ICX analysis and evaluation.

**Table 1.** Research questions that guided the review.

ID	Research Questions (RQ)
RQ1	What is ICX?
RQ2	What factors influence ICX?
RQ3	What methods are used for ICX evaluation?

### 3.2. Literature Search

In this literature review, we considered only works from the last decade (from 2012 to 2022), which were published in four databases with the largest compilation of studies about information management, and information systems, among other topics, associated with ICX: Scopus, Web of Science, Science Direct, and ACM Digital Library. The searching terms were the same for all databases: “Work” and “Information” and “Employee” and “Organization” and (“Interaction” or “Experience” or “Perception”), and it was searched in the title, abstract, and keywords of the studies. As an initial result, the number of works that match our search terms in every database is presented in Table 2.

**Table 2.** Search results in databases using our search terms.

Database	Number of Studies	% Studies
Scopus	961	48.8%
Web of Science	813	41.3%
Science Direct	119	6.0%
ACM Digital Library	76	3.9%
Total	1969	100%

### 3.3. Study Selection Criteria

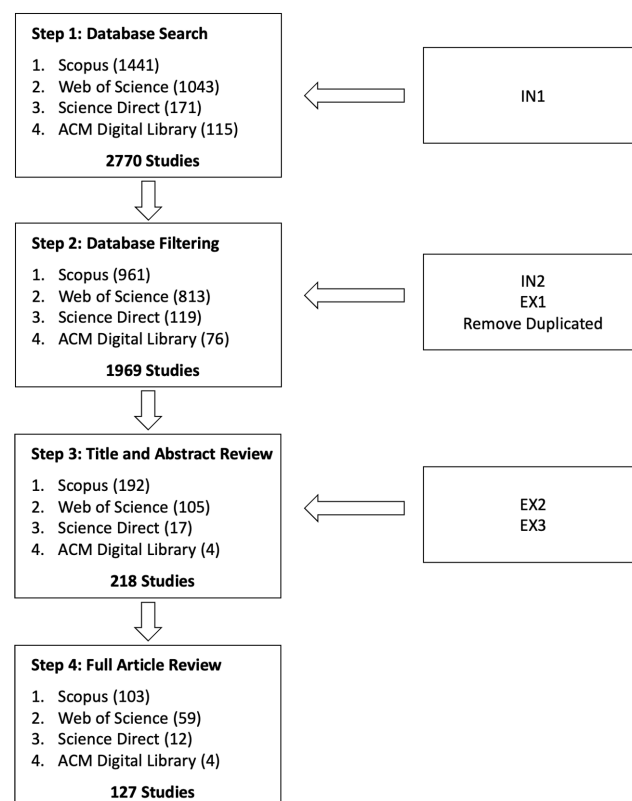
We perform a selection of the works related to the ICX concept, with no exclusion in terms of subject areas or research methods. For this selection process, we define two inclusion criteria and three exclusion criteria, which are presented in Table 3. As can be observed in this table, the selected papers were limited to articles published in the last decade and related to our research questions. The rejected studies were those that were not involved with an organizational environment, those that did not assess the consumer's interaction with information systems or data, and those that used information technology in other domains. All these selection criteria arise from the complex and multidisciplinary elements included in the definition of ICX and aim to review studies from different areas that give us a holistic perspective.

**Table 3.** Study selection criteria for the review.

ID	Category	Criteria
IN1	Inclusion	Articles published between 2012 and 2022
IN2	Inclusion	Articles referring to research questions
EX1	Exclusion	Strictly organizational environment
EX2	Exclusion	Interaction with information
EX3	Exclusion	Information technologies at work

### 3.4. Study Selection

After the application of our selection criteria, the number of selected papers decreased drastically from 2770 to 127. This study selection process includes three steps, each with its own inclusion and exclusion criteria applications. The flow of this process is presented in Figure 1.



**Figure 1.** Flow diagram of the paper selection process. In every step, the distribution of studies examined by the database is shown. Further, the total count of studies examined is shown. These numbers may differ in step 3 as some of the studies were indexed in more than one database.

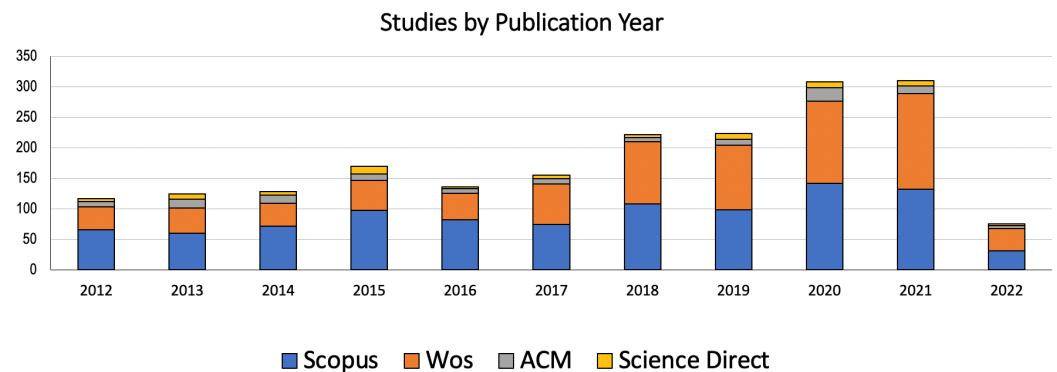
## 4. Data Synthesis

Resulting from the selection process, 127 studies were selected as candidates for a full review. In this section, a description of the selected papers is presented, including publications through the years of the initial search result (2770 studies), and also the document type and subject area of the final selection of publications (127).

### 4.1. Year of Publication

As can be seen in Figure 2, the number of papers published by year from the initial search result has constantly been increasing, from 117 in 2012 to 310 in 2021. Regarding the distribution by database, the main portion of the works is published in Scopus and WOS. The majority of the papers are in Scopus until 2017; after this year, WOS takes the lead. On

the other hand, the number of papers extracted from ACM and Science Direct is much less than WOS or Scopus, where ACM presents more works than Science Direct.

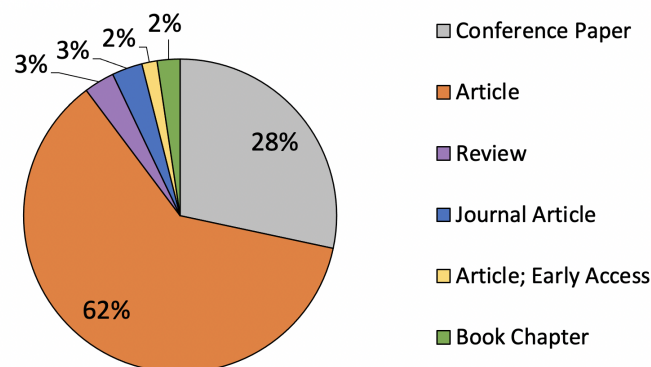


**Figure 2.** Studies published by year.

#### 4.2. Document Type

The 127 selected works were published as different document types; the documents can be classified as Conference Paper, Article, Review, Journal Article, Early Access Article, and Book Chapter. The majority of the works were classified as Article, reaching 62% (78 works). The other common works were classified as Conference, with 28% (36 works). On the other hand, the works classified as Journal Article and Review only reach 3% (4 papers) for each document type. Finally, 2% (3) of the papers were classified as Book Chapter and another 2% (2) of the papers were classified as Early Access Article. This distribution can be seen in Figure 3.

#### Studies by Document Type



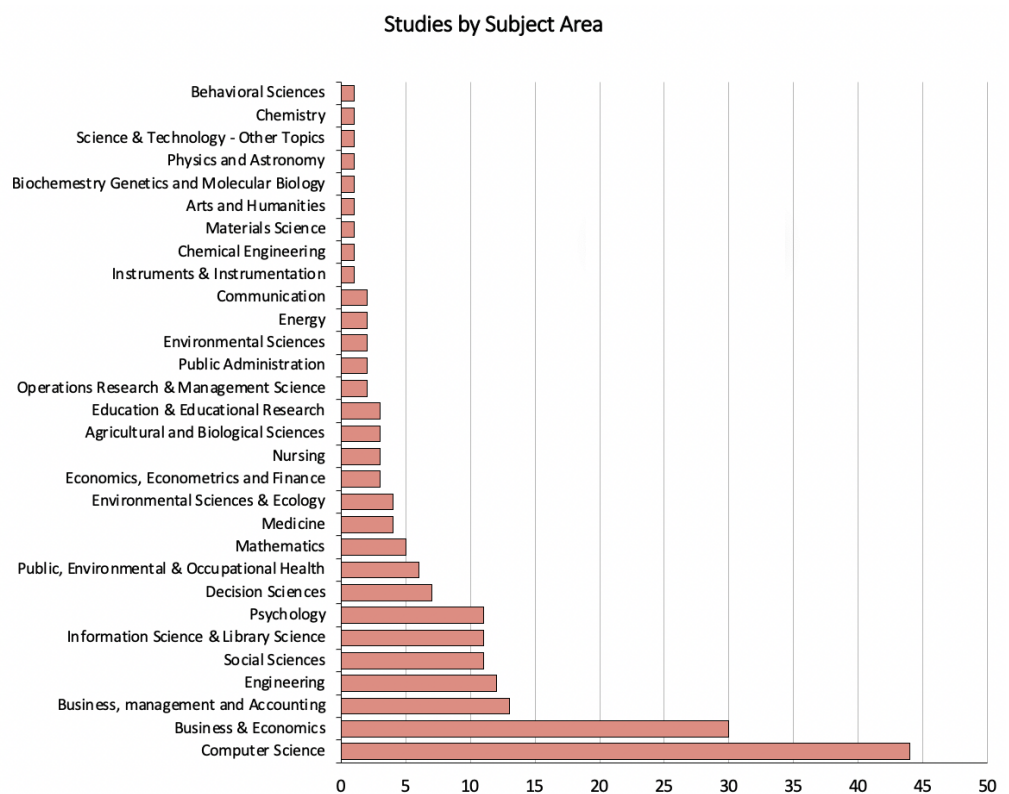
**Figure 3.** Document type distribution.

#### 4.3. Subject Area

Figure 4 presents the distribution of the 127 selected works into 30 different subject areas, from computer psychology to Engineering. The vast majority of studies are in the “Computer Science” area, with 44 studies, followed by “Business & Economics” area, with 30 studies. Then, the following areas are “Business, management and Accounting” and “Engineering” with 13 and 12 studies, respectively. “Social Sciences”, “Information Science & Library Science”, and “Psychology” follow with 11 studies each.

The areas with minus participation were “Chemical Engineering” and “Instruments & Instrumentation” both with only 1 study, followed by the areas “Communication”, “Energy”, “Environmental Sciences”, “Public Administration”, and “Operations Research & Management Science”, all with 2 works each. It is important to consider the multidisciplinary nature and approach of the ICX concept as it joins multiple areas in the literature.





**Figure 4.** Studies subject area.

## 5. Answering Research Questions

### 5.1. What Is ICX? (*Information Consumer Experience*)

Although there is no formal description for the ICX concept found in the literature, there are certain definitions that approach ICX from different perspectives and frameworks, which together could converge to make an initial definition of the concept. In this sense, there are concepts associated with the consumption of information in organizations, such as Information Literacy, Information Management, and IT Customerization. Each one of them with its own approaches to the relationship between consumers and information, factors that influence those relationships, and specific methods used to analyze and evaluate those interactions and effects.

Employee experience has been studied [25,26] with different approaches. In [25], Design Thinking and human-centered design roles in the process of transformation were studied, considering employees' experiences as input for organizational reengineering processes. On the other hand, employees' perceptions have been analyzed using computer simulation [26] of employees performing several tasks. These approaches use employee experiences in their broader definition, the scope of which differs from ICXs scope. Employee experience involves an employees perceptions of the working task and whether information products, systems, or services interaction are implicated or not. Meanwhile, ICX involves employees' perceptions of a task that requires information usage or sharing using some kind of information product, system, or service.

Information Literacy is known as the ability to identify information needs, in addition to access, evaluate, and effectively use the information [27] for learning-related activities. In the workplace, Information Literacy involves five different dimensions: information acquisition, information evaluation, awareness of the information environment, information usage, and learning from information experience [28]. In an organizational context, Information Literacy has been commonly studied in association with its effects on employee's performance or creativity in work activities [27,29]. In [30], the employee demographic and learning activities in the workplace data influence employees' learning experiences.

Information Literacy is a crucial factor for employees of technological companies [31,32] because they have to learn new techniques, tools, and technologies every day to solve problems or innovate the performance or security of their products. In this sense, Information Literacy has been probed as a factor that can improve organizational performance and enhance social capital (defined as the network for knowledge generation inside the organization), assessing its three dimensions: (1) a structural dimension that is related to the knowledge-sharing network, (2) a relational dimension associated with the trust perceived by an employee on knowledge sources (such as databases, information systems, or another employee), and (3) a cognitive dimension that involves employees' shared language and vision as they work in a collaborative way for knowledge generation [28,33,34]. Some authors [27] have already pointed out that a person's experience approach could be used to explore Information Literacy in the workplace. Another approach related to employees performance factors have been studied in [35], in which the Multitasking-based use of Information Technology (MUIT) by employees in an organization was examined, using cognitive load theory and multiple resource theory to analyze the relationship between MUIT and cognitive load, and its relationship with employee performance.

Another concept associated with ICX is Information Management (IM) [36–41], defined as a method for acquiring, storing, processing, and delivering information in order to improve management efficiency within organizations. Information Management research arises from academic information management, applied in bibliographic services in universities or institutions that serve information to a specific type of consumer. This topic is related to librarians' expertise in information searching, sorting, collecting, and disseminating, generally dealing with a large amount of information [36]. However, in the workplace, IM involves employees' behavior, data, technology, and processes for information management. This management can be performed with physical and digital information, which is used for knowledge generation or application [36]. There is a reciprocal relationship between IM and the organization, where IM improves the information management mechanism in a way that the employees know where the information is stored and how they can use it. Further, IM can facilitate information sharing and collaborative work between employees, which can lead to better information understanding and learning, improving decision-making tasks for the organization [36,42–45].

Another important approach is the Technology Acceptance Model (TAM) [2,3,8,46–56], which studies user intention to use new technology and the factors that affect its acceptance of use in the workplace. Another important approach to studying the interaction between information consumers and the information system of the organization is the analysis or improvement recommendation of Information System functionalities [18,37,57]. In this approach, the user's perceptions are analyzed in order to verify if the current state of a specific information system accomplishes the user's expectation. In [18], an information system benchmark was performed to analyze the top-ten best software for Electronic Human Resource Management (E-HRM), analyzing the expectations of employees from the five biggest Indian information technology employers. In [18], an evaluation grid for measuring employees' perception about the degree of alignment of the information systems they use for work to support knowledge sharing in different organizational culture contexts is shown. With this evaluation grid, information system functionalities were classified in order to support knowledge sharing in a cultural context, such as hierarchy culture, market culture, clan culture, and adhocracy culture. Regarding information system functionalities recommendation, in [37], a set of functionalities enhancements were proposed for Knowledge Management Systems (KMS) in order to improve the support for employee learning, enable work efficiency and effectiveness, and improve the internal processes of the organization. These enhancements included improvements to existing functionalities and recommendations for the development of new functions, which were validated by Knowledge Management experts from a specific organization in Thailand. An Evolution of TAM has been studied [1,2], where a Human-Centered Perspective on Software Quality for evaluating smart assistance systems (empowered by artificial intelligence technology)



users' intention of use. Another interesting application of artificial intelligence technology was used in [58], as a centralized and intelligent information access tool is proposed to allow the employees of large organizations to access information from multiple information systems and services provided by the organization. This tool is based on artificial intelligence models in order to improve information access and the quality of work and experience of employees. On the other hand, employees' perceptions of the insecurity of technological service usage have been studied [13], using Conservation of Resources (COR) theory, analyzing the negative influence on the perceived technological insecurity from non-technology-related resources' availability in the workplace, such as organizational support for strengths use and friendship opportunities.

Job satisfaction involves an employee's perception and evaluation of their job [59,60], and it has been studied as a factor influencing an employee's performance at work. In [59], job satisfaction is analyzed with an organizational climate as a factor that influences employees' perceptions, taking employees' personality traits of dominance and sociability as moderator variables. The quality of work-life approach [60–62] has been associated with job satisfaction. In an Indian bank employees context [60], the quality of the relationship between work-life factors and job satisfaction was studied based on the influence of socio-demographic characteristics, such as age, gender, job title, work experience, and salary. Employee Happiness has also been studied [63] as an approach to employee satisfaction perception in the case study performed in an Indian Information Technology Company.

The Information Behavior (IB) approach has been used in [64–66] to study information practices performed by an employee to accomplish their job and the relationship between holistic information behavior and perceived employee success, which is linked to organizational performance.

Many studies focus on the analysis of the usage or adoption of technology in the workplace [8,10,12,14,67,68], using different approaches, such as collaborative working information systems data analysis [12,68] or Information Technology Consumerization (IT Consumerization) [14]. Collaborative working using technology at work has been studied, analyzing how employees share information with peers or with employees from other hierarchy levels [68], looking for factors that improve creativity at work [27,67,69,70], or the knowledge learning network approach [71].

The relationship between information consumers and the use of Information and Communication Technologies (ICT) at work has also been studied in the literature; the adoption of ICT at work is also known as Information Technology Consumerization (IT Consumerization), and it is defined as the use of ICT services, systems, or devices that are provided by the organization (or owned by the employees in some cases) for working purposes [14]. IT Consumerization has been modifying the way that employees communicate with IT departments, as they are more empowered on how and when to use ICT, which places more responsibility on the employees. Further, organization policies about ICT usage could influence employees' actions and work.

As it has been observed, no formal or informal definition of the Information Consumer Experience (ICX) has been founded in this systematic review, but there are several concepts or approaches associated with ICX widely studied in the literature, such as Employee Experience [25,26], and the ability to understand and learn how to use information products, systems, and services [27,28,31,33]. The ability to manage [36,37] and share [12,27,39,57,71–77] information, intention (TAM) [2,8,46–52], and facility (User Experience, UX) [18,37,57,71,78,79] to use new information systems or services. Further, job satisfaction approaches [59–61] and other interesting qualitative approaches have been studied [14] in order to analyze the interaction between employees and their organization's resources and regulations in the workplace. The studies mentioned above represent an empirical and theoretical background for the potential application of the CX perspective to address ICX, its definition, evaluation, and analysis methods and approaches. In this sense, in Table 4, different approaches used in the literature to address ICX-related problems are shown with their respective associated studies.

**Table 4.** Studied approaches for ICX concept.

Approach	Studies
Employee Experience	[25,26]
Information Literacy	[27,28,31,33,80]
Information Management	[36–38]
Information Sharing	[12,39,57,72,73,75,76]
Technology Acceptance Model	[2,3,8,46–52,54–56]
Job Satisfaction	[59–61,63]
User Experience	[18,37,57,71,79]
Knowledge Learning Network	[27,71]
Social Science	[14]
ICT usage at the workplace	[10,12,14,39,67–69,81]
Conservation of Resources Theory	[13]

The lack of a definition for ICX or a similar concept (besides the CX approach) represents an opportunity for us to introduce the first definition of ICX to the body of knowledge and open a new research trend to explore the information consumption within an organization with a CX perspective, in order to generate a broader assessment of the interactions between specific organization members with internal (or external for internal use) information products, systems, and services, across the touchpoints of an information consumer journey (inherited from CX domain). Therefore, ICX can be considered a particular instance of the CX concept and could be addressed using analytical methods from the CX approach. Our proposed definition of ICX is: “Information Consumer Experience (ICX) involves all the interactions between employees (consumers) and information products, systems and services inside an organization, including tasks such as information usage, information generation, information management, information inter-department sharing, information usage, based team work and decision making”.

### 5.2. What Factors Influence ICX?

In ICX-related approaches, several factors related to the employee, the organization, or the information products, systems, and services have been studied regarding the specific goals and methods of the used approach. Factors related to the information itself have been studied [67,82,83], factors such as Information Availability, which is related to the information interaction mechanism provided by the organization to the consumer, and Information Quality, which is related to data attributes that can influence consumers’ perception about the information provided by the organization. Studies related to the UX approach [18,37,57,71,84] have examined factors on user interaction with information systems and services, such as user interface quality, online communication quality, and user satisfaction.

Related to information availability, some authors [67,85] say that factors such as access to new and diverse information contribute to improved employee creativity at work. Employees could feel more empowered at work when they have easy access to information [83]. Further, better access to information could increase work satisfaction as well as the perception of fairness in organization procedures [83]. In [86], the authors investigate how Information Availability affects the relationship between work passion and job satisfaction, job tension, and job performance, using a self-determination theory-based model. However, excessive exposure to information can be harmful to employees since an overload of information reduces their capacity to integrate and synthesize information to generate simple and functional ideas at work [67,87]. Further, in [88], technological service-related characteristics such as reconfiguration and customization capabilities and their relationship with employees’ performance were studied.

On the other hand, an overload of information could increase cognitive fatigue and decrease employees’ health and commitment [89–93]. In this sense, in [15], employee stress factors related to virtual resources (Information systems and services) and virtual

teamwork were investigated. Regarding Information Quality factors, there are data quality characteristics such as accuracy, completeness, and opportunity that could impact the perception of employees feeling informed [82]. In [94], the relationship between Information Quality (IQ) perceived by the users of information systems and the individual impact (which is defined as the measure of how much an Information System can influence the capabilities of users) was studied through a case study developed in a public Brazilian university. Another interesting personal employee factor that has been studied was the difference between work expectations versus actual work experience [95] when they had a hyped image of the job position or organization when they were hired.

From the social science domain, the Structuration Theory has been adapted to fit the interactions between the employee and the organization through the information resources used in the workplace. The Structuration Theory is an ontological theory that studies the social relationship between structures and agents. Structures are resources and all the rules or policies that can constrain or allow actions performed by the agents over these resources. On the other hand, agents are people that can perform actions on the resources and regulations given by the structure [14,71]. Structures can be classified into three dimensions: domination (related to power), signification (associated with meanings that can rule agents' actions), and legitimation (policies that are rules too). In the domination dimension, resource structures can be allocative (when it allows resources to be controlled), authoritative (when it allows people to be controlled), and the other type of rules can be classified as signification or legitimation dimensions. In [96], the interaction of the structure between Information Technology departments with other departments in the organization was studied in order to analyze differences in planned and actual employee interactions using Social Network Analysis (SNA).

In the workplace, The Structuration Theory is applicable if the employees are seen as agents and the information, technology, and organizational resources and rules are considered structures. In this sense, in [14], four different structures were identified: (1) Policies, which are rules related to the use of information to ensure the privacy and safety of organizational data, (2) Equipment, which involves the usage and care rules about the software, (3) Hardware and other resources provided by the organization, or resources that they take to the workplace, and (4) Tasks, including standards of quality, time limit, or any other kind of rules related to the employee's work process. Authority is related to organizational hierarchy limitations for an employee's functions, obligations, limitations, payment, and communication with other employees (specifically with employees from other hierarchy levels). In this sense, the workplace design [7,97] and the level of technological equipment [98] of employees from the same organization were analyzed, focusing on the interaction dynamics between fully and low-equipped employees. Employees' perceptions of risk in their communication and their behavioral responses when using Information Communication Technologies (ICTs) in the workplace have been studied [99]. On the other hand, psychological (in contrast to behavioral) experiences of employees working with communication technologies in the organization were studied in [100,101].

Regarding remote working, in [102], on the supporting factors of digital workplace diffusion in Malaysian public sector organizations, the authors performed a preliminary study based on the qualitative analysis of data collected via structured interviews. Their results show that principal factors are advanced technological tools (such as social technologies tools, contextual intelligence tools, mobility, and communication infrastructure), top management support, and the talent of employees in the organization.

Employee experiences were examined in [26] using computer simulation of employees performing several tasks; these experiences were classified into different levels of experiences, based on the relationship between the employee and the task. They described experience levels, such as experiences in a particular task, experiences performing tasks of a specific process and experiences in tasks that a certain role was assigned to the employee. As can be observed, these levels of experience can be related to the social dimension of an

employee's work in the organization, as they have to collaborate with other employees in the processing task, representing a specific role.

In [12], information sharing is studied related to hierarchical structures in organizations. They indicate that hierarchy is a mechanism used for organizations to organize people regarding certain levels of responsibility and coordination needs in order to effectively manage the resources of the organization, and their results show that hierarchical levels represent invisible barriers that limit the communication and information sharing between employees in the workplace. Regarding this issue, different factors that could obstruct information and communication flows have been identified, such as hierarchical level, staff responsibility, communication activity, the grade of culturally driven organization, power distance, and non-existing communication through different hierarchical levels [12]. In this context, culturally driven alludes to common values and goals shared by all the members of the organization. Meanwhile, power distance is a measure that describes the employee acceptance of inequalities naturally produced by organizational hierarchy. The results obtained in [12] by analyzing these factors' influence in cross-hierarchical levels show that in the digital work environment, power distance does not have a significant influence. Additionally, middle hierarchical levels demonstrate the least vertical information sharing to other levels. In [103], the communication between employees is analyzed in a case study with rural nursing managers, showing that communication technologies improve employees' collaboration at work. In [104], the media richness theory is used to analyze the factors that affect effective communication and information sharing between employees, relating them to information keys, personalization, and the speed of feedback.

Some authors, e.g., [16], have shown that the use of information systems in workplace faces user resistance behavior, which could be related to users' perceptions of the information system and their perception of work routines. An interesting approach related to information consumption is the Self-Service Engagement proposed in [105]. Based on Trying Theory, when information consumers face an information system error or other problem, they do not ask for help from their organization's Information Technology Department, but prefer to solve the problem themselves by learning on the web (or any external information systems or services) sources to solve this problem in order to perform the initial job. This approach involves employees' characteristics (or lack of them [106]), such as self-efficacy and self-competency, which construct a higher ability called self-sufficiency [105]. During the COVID-19 pandemic, the relationship between remote working employee characteristics (such as mental load and team support) and technology-related characteristics (such as perceived ease of use, perceived usefulness, and technology acceptance) and its influence on employees' work engagement was analyzed [49].

According to the studies analyzed, the factors that influence the information consumption experience of employees within their organization follow a structure that starts from a Consumer Dimension that includes preferences and aptitudes, such as the degree of data access and data exposure, which can be helpful in the workplace but harmful if the consumers take the job to their house [15,67,83,89].

Other factors that influence information consumer behavior have been studied, such as power distance [12], sociability [59], dominant personality [59], resistance to changes [16], and self-sufficiency [105]. There is also a social dimension that includes the interactions between consumers regarding information sharing [12,73,74], communication abilities [12], and friendship opportunities with other employees [13]. In addition, there is a context dimension that involves the characteristics of the mechanisms provided by the organization for interacting with information, such as equipment and job-related policies [12,14,82] have also been studied.

In Table 5, a resume of all the factors identified in the reviewed studies is shown. This resume contains a dimension that represents a proposed categorization of factors in order to unify the large number of factors reviewed. This table shows factor categorization made by authors, factor names, and the list studied where the factor was mentioned. Further, the associated customer interaction dimension from the CX domain [21] is mentioned,

highlighting the pragmatic dimension as information consumers are usually performing a specific task in a working context.

**Table 5.** Factors influencing ICX.

Dimension	Category	CX Dimension	Factors	Studies
Personal	Data Availability	Pragmatic	Access	[67,83,89]
		Pragmatic	Exposure	[67,83,89]
	Cultural Personality	Relational	Power distance	[12]
		Relational	Sociability	[59]
		Relational	Dominance	[59]
		Emotional	Stress	[15]
	Competency	Cognitive	Resistance Behavior	[16]
		Cognitive	self-sufficiency	[105,106]
Social	Information Sharing	Relational	Communication activity	[12]
		Relational	Communication through different hierarchical levels	[12]
		Lifestyle	Quality of working life	[107,108]
		Relational	Friendship opportunities	[13]
		Cognitive	Experience Level	[26]
Organizational	Information Quality	Pragmatic	Accuracy	[82,94]
		Pragmatic	Completeness	[82]
	Technology characteristics	Pragmatic	Opportunity	[82]
		Pragmatic	Technology Reconfigurability	[88]
	Organizational Structures	Pragmatic	Technology Customization	[88]
		Pragmatic	Technology usage policies	[14]
		Pragmatic	Equipment policies	[14,98]
		Pragmatic	Task performing standards	[14]
		Pragmatic	Authority related rules	[12,14]
		Relational	Hierarchical level	[12]
		Relational	Staff responsibility	[12]
		Lifestyle	Culturally driven Organization	[12]

### 5.3. What Methods Are Used for ICX Evaluation?

In the same way that different approaches for ICX exist, several types of methods have been used to address the information consumption problem in an organization. In the reviewed studies, methods of statistical analysis techniques [27,28], algorithmic [26,109] to semi-structured and custom qualitative interviews [1,10,14,33,78,81,110–116] were found.

Employee experience has been studied with Design Thinking and human-centered design [25] in organizations in a process transformation context. In this work, authors have shown that CX methods, such as Customer Journey Map (CJM), can be used in order to analyze employee experiences in the workspace, and therefore, there is a candidate method to explore the ICX approach.

In order to explore and analyze workplace information consumption, in [14,33,110,117], a set of semi-structured interviews were performed with a set of prepared questions about a participant's use of information technologies at work, and more questions could be added of the conversation flow. The findings of this work were obtained by applying a qualitative analysis of participants' answers.

Information Literacy in the workplace has also been studied with a qualitative interview. In [33], the role of Information Literacy in the learning of innovative work behavior was addressed using a custom interview to collect data from 12 respondents. These data



were recorded on audio, transcribed to a text file, and loaded into NVivo software for data codifying and data analysis. Another custom questionnaire methodology was used in [89], where an online questionnaire was sent to Line instant messaging application users in Taiwan in order to examine the relationship between online social anxiety, perceived information fatigue, and job engagement. Later, statistical analysis was performed in order to identify significant and validated relationships between those factors. Custom questionnaires have also been used in [82], where the authors delivered an online questionnaire that attempts to measure seven information quality dimensions (accuracy, consistency, believability, relevance, completeness, accessibility, and timeliness). Then, they used multiple regression analysis in order to analyze the data collected from 46 participant companies (only one company member responded to the questionnaire).

In [118], the Work Environment Impact Scale-Self Rating (WEIS-SR) is used to study the experience of employees in a small United States college. WEIS-SR is a self-rating instrument that allows the analysis of an employee's perception of their work environment characteristics. In [27], an adaptation of the Association of College and Research Libraries (ACRL) Questionnaire was used to measure 22 Information Literacy abilities, in addition to creativity measures adapted from [119] and performance measures adapted from [120], for analyzing Information Literacy relationship with workplace abilities, such as performance or creativity. On the other hand, in [121], user satisfaction with information technology adoption (self-service technology, SST) in the corporate context was studied. In order to evaluate the perceptions of the users, an adaptation of the SSTQUAL instrument was used to measure four dimensions of the SSTQUAL quality scale: functionality, security, design, and customization.

In order to analyze questionnaire responses and hypotheses, a Partial Least Squares (PLS) was performed using the SmartPLS 3.0 software [122] in different studies [8,28,64,79,105]. In [28], the Information Literacy impact on the social capital (knowledge generation) of the organization was studied using an email-delivered online questionnaire consisting of a demographic section and a second section that includes Information Literacy and Social Capital measures, adapted from [123] and [73], respectively. For questionnaire data analysis, the Partial Least Squares structural equation modeling (PLS-SEM) was used, using SmartPLS 3.0 software. PLS-SEM is a multivariate technique that is less restrictive than the PLS model in terms of size and data normalization. Other studies, such as [64], use the PLS-SEM technique in order to analyze questionnaire responses about a model that represented the relationship between Information Behavior (IB) and work success. In order to assess the Self-Service Engagement approach, in [105], a set of interviews and a Likert Scale-based questionnaire were used to collect data, which were analyzed by using PLS-SEM modeling and other statistic techniques in SmartPLS 3.0 software. In [8], a technology Acceptance Model (TAM) was proposed in order to examine employees' intention to use Enterprise Resource Planification (ERP) Software by analyzing employees' perception of work alienation and organizational support. They also used a customized questionnaire for data collection and PLS modeling on Smart PLS 3.0 software to validate their model and confirm correlations that affirmed their hypothesis.

In [124], a model was proposed in order to analyze how Supply Chain Management (SCM) employees' perception of the changes produced by the implementation of a new SCM system (such as process complexity or process rigidity), could affect their job outcomes (such as job performance, job satisfaction, job anxiety, and job security) and the outcomes of the supply chain process (such as process performance and relationship quality). To collect data, authors designed a three-step experiment to obtain users' perceptions before (demographic survey) and two instances after the implementation of the new SCM system started (users use the new SCM system and respond to a survey about the perceived change in their SCM tasks and process). Demographic data from the first survey was processed using a Structural Equation Modeling (SEM) confirmatory factor analysis. Meanwhile, the second and third surveys' data were analyzed using univariate and multivariate regressions from the Latent Growth Modeling (LGM) approach. The results of this study show that

employees perceive a significant change in their work process complexity and rigidity and also perceive that their work processes change drastically with a new SCM system implementation, and those changes can decrease employee and process outcomes.

In [125], a quantitative analysis was performed in order to study demographic, financial, and non-financial factors that influence the perceived level of satisfaction from employees of different public organizations in Pakistan. Information about factors that affect the perceived satisfaction level of employees was collected using a self-administered questionnaire. This questionnaire is a custom instrument elaborated on identified factors from the literature review made in the study [125]. Statistical tests were applied in order to find and validate significant relationships between factors and employee satisfaction levels; the Statistical Package for Social Sciences (SPSS, version 20) was used to perform statistical analysis from the questionnaire.

Other methods were used in [59,60,63,107,108,126–129] to examine the connection of job satisfaction with work-life quality factors. In the context of Indian bank employees [60], a survey questionnaire was performed, which was composed of two specialized data collection instruments: The measure of Quality of Work Life Scale (41 statements) proposed in [130] and The Job Satisfaction Survey proposed in [131] (36 statements). Both instruments use a five-point Likert scale (from “strongly agree” to “strongly disagree”). The analysis of the collected data was conducted by applying descriptive statistics for socio-demographic data, regression analysis to analyze the impact of the quality of work-life factors over job satisfaction, and  $\chi^2$  statistics to examine the association of quality of work-life and job satisfaction with socio-demographic variables included, such as age, gender, job title, work experience, and salary. The results of the study show a negative association between the quality of work-life and job satisfaction, with a significant amount of variance ( $R^2$  of 61.40 percent) explained by the quality of work life constructs over job satisfaction perceptions. In [59], personality traits of dominance and sociability were used as moderators of the relationship between job satisfaction and organizational climate. In [59], dominance is defined as the need to control the work activities of other employees, and sociability is defined as the employee’s need and ability to interact with other employees. This study used a hierarchical multiple regression analysis performed via statistical software SPSS. Hierarchical regression was also used in [35] to analyze the data collected using the Experience Sampling Method (ESM), which allows the gathering of data from employees multiple times in a certain period (i.e., two weeks).

The analysis of the interactions between employees and information resources from a knowledge network approach can be studied using Activity Theory, Actor–Network Theory, or Social Network Analysis (SNA) in order to map the roles, relations, and interactions that employees performed in a working context [71]. SNA has also been proposed to analyze employee attitudes towards collaborative working [34,68,132,133], some of these studies used data collected from a questionnaire (for attitude information) and an Enterprise Collaboration Software (ECS) in order to study the interaction between users and digital documents or resources that are an object of their collaborative work. ECS data were also used to examine personal and social factors that affect employees’ interaction with information in [132].

The grounded theory has been used to derive a theoretical model from qualitative data [103,134,135] with a set of well-defined steps: data open coding, axial data coding, selective data coding, and relationship identification between different coded data categories. In [134], the grounded theory approach was used to study the use of Intelligent Employee Assistants (IEA) in the workplace, collecting data through a custom interview with working professionals and applying grounded theory techniques (data coding) to generate a theoretical model for describing the task for that employees uses IEAs and how these technologies affect their job outcomes.

A method called Information Processing Support Index (IPSI) was proposed in [136], which aimed to measure the facilities of workers who use mobile devices for job-required information processing activities, such as content generation and content consumption

activities. They used the Q-Sort test to collect data from users performing information processing activities as input for IPSI score calculation.

From the Outsourcing data collection method, in [9], an Intra-Company Crowdsourcing (ICC) method was proposed. This method was designed to collect data using a Chatbot to ask employees randomly selected questions from a customized questionnaire during their work activities on different devices. The authors define ICC as “an IT-enabled group activity based on an open call for participation in an enterprise” and they validate this method in a case study, with promising acceptance from employees.

Most of the methods found in this systematic revision to address ICX-related approaches are based on custom questionnaire implementation [42,47–50,55,57,63,87] designed to collect data about employees or information consumer perceptions about specific measurement constructs or to identify factors that could affect this perception. Most of these questionnaires were based on others questionnaires adaptations, such as the ACRL Questionnaire [27], Quality of Work Life Scale Questionnaire [60], WEIS-SR Questionnaire [118], Job Satisfaction Survey [59,60], and Intra-Company Crowdsourcing Questionnaire [9]. Then, after data collection, a set of statistical techniques, such as multiple and hierarchical regression or PLS, SEM, and LGM modeling, have been used to validate the authors’ approach and obtain perception metrics and correlations [48–50,75,137,138].

These kinds of approaches have been widely used, in our opinion, because they offer the required flexibility for adapting a methodology to a specific organization, department, and consumer sample, which is a big advantage over other methods, such as Social Network Analysis [68,71] and theoretical modeling [71]. On the other hand, as a large number of different custom methods, constructs, and factors have been used, the security of the use of the right methods has to be validated with complementary methods. In this sense, the alternatives used were semi-structured and open interviews [1,14,33,37,46,90,95,112,126], which offer a complementary approach to give explanations to describe a phenomenon [14] and, in our opinion, to explain the causes of quantitative results too.

A classification resume of the methods found in this systematic review is presented in Table 6. Showing the method’s classifications, names, and associated studies.

**Table 6.** Methods used to address ICX-related problems.

Type	Method	Studies
Interview	Semi-structured Interviews	[1,3,14,33,37,46,52,78,81,90,95,96,111,112,126]
Questionnaire	Adapted Scaled Questionnaire	[13,16,28,30,42,47–50,53–57,63,68,72,74–76,82,84,86,87,92,96,124,129,137,138]
	SSTQUAL Questionnaire	[121]
	ACRL Questionnaire	[27]
	Quality of Work Life Scale Questionnaire	[60]
	WEIS-SR Questionnaire	[118]
	Job Satisfaction Survey	[59,60]
Conceptual	Intra-Company Crowdsourcing Questionnaire	[9]
	Customer Journey Map (CJM)	[25]
Modelling	Social Network Analysis	[68,71,96,133]
	Grounded Theory	[103,134,135]
	Ontological methods	[14,71]
Statistical	Information Processing Support Index (IPSI)	[136]
Modelling	Statistical Analysis (Regression, PLS, SEM, LGM)	[13,16,27,28,30,42,47–50,53–56,59,63,68,72,74–76,82,84–87,90,101,118,121,124,125,137,138]

## 6. Conclusions

The experience of information consumers within an organization has been partially studied in the literature; some works addressed the employee experience in any type of job (not only information-based jobs) [25,26,59–61,63], and other works faced information management and sharing within an organization [12,27,36–39,57,71–73,75,76], meanwhile, others studies addressed information systems acceptance and success [2,3,8,18,37,46–52,54–57,71,79].

According to the studies analyzed, the factors that influence the information consumption experience from employees within their organization to follow a structure that starts from a Consumer Dimension that includes preferences and aptitudes, such as the degree of data access and data exposure [67,83,89], such as power distance [12], and resistance to changes [16], among others [16,59,105]. All this factors can be helpful in the workplace but harmful for remote working, when employees works in their own houses [15]. A second dimension called Social Dimension involves factors originated from social activities performed by consumers in order to fulfil their jobs. These factors are associated to activities such as information sharing [12,73,74], consumers aptitudes such as communications abilities [12], and friendship opportunities with other employees [13]. In addition to consumers own abilities and activities, there is a Context Dimension including consumer external factors that could influence their experience, related to organizational regulations for information handling such as equipment and job-related policies [12,14,82]. All those factors could lead to promising analysis because they allow the development of an integrated approach to address the experience of the information consumer involving their technological and social abilities, behavioral characteristics, the used information systems characteristics, and specific organizational scenario. Related to methods that could be used for ICX method evaluation, several custom questionnaire implementations have been used in the literature for collecting data about consumers perceptions and its relationship with one or more factors [42,47–50,55,57,63,87]. These custom questionnaires are adaptations of widely used questionnaires such as the ACRL Questionnaire [27], WEIS-SR Questionnaire [118], Job Satisfaction Survey [59,60], and Intra-Company Crowdsourcing Questionnaire [9]. The data obtained using these custom questionnaires has been analyzed using statistical techniques such as PLS, SEM, and LGM modelings in order to compute perception metrics and factor correlations [48–50,75,137,138].

These kinds of approaches have been widely used, in our opinion, because they offer the required flexibility for adapting a methodology to a specific organization, department, or consumer sample, which is a big advantage over other methods, such as Social Network Analysis [68,71] and theoretical modeling [71]. On the other hand, as a large number of different custom methods, constructs, and factors have been used, the security of the use of the right methods has to be validated with complementary methods. In this sense, the alternatives used were semi-structured and open interviews [1,14,33,37,46,90,95,112,126], which offer a complementary approach to give explanations to describe a phenomenon [14] and, in our opinion, to explain the causes of quantitative results too.

The lack of a definition for ICX or a similar concept (besides the CX approach) represents an opportunity for us to introduce the first definition of ICX to the body of knowledge and open a new research trend to explore information consumption within an organization with a CX perspective, in order to generate a broader assessment of the interaction of a specific organization's members with internal (or external for internal use) information products systems and services. Therefore, our proposed definition of ICX is: Information Consumer Experience (ICX) involves all the interactions between employees (consumers) and information products, systems, and services inside an organization, including tasks such as information usage, information generation, information management, information inter-department sharing, information usage, based team work, and decision making. Therefore, ICX can be considered a particular instance of the CX concept and could be addressed using analytical methods from a CX approach.

Therefore, the main contribution of this review is to bring a formal definition of ICX and summarize the different approaches, factors, and methods related to ICX modeling,

evaluation, and design. Finally, future research is related to the development of a new methodology with a Customer Experience approach to address all ICX components. In the future, we will analyze this phenomenon considering the factors influencing ICX identified in this review, and different techniques from the CX domain, such as need analysis and touchpoint identification, among the other methods identified in this review, in order to recognize and evaluate the interactions between consumers and information products, systems, and services offered by the organization.

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