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RCMOS - Multidisciplinary Scientific Journal The Knowledge.
ISSN: 2675-9128. São Paulo-SP.

Year VI, v.1 2025 | Submission: 12/23/2025 | Accepted: 12/26/2025 | Publication: 12/29/2025

Privacy, data protection and information security in the digital society: legal and technological challenges.

Privacy, data protection and information security in the digital society: legal and technological challenges

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SUMMARY

The expansion of digital technologies and the increasing use of computer networks have modified the ways in which we communicate, circulate information, and conduct economic and social activities. In this context, personal data has come to occupy a strategic position, becoming relevant elements for organizations, users, and different business models, while simultaneously amplifying the challenges related to privacy, information security, and the protection of personality rights. This article aims to discuss the relationship between privacy, personal data protection, and information security in the context of the technological society, considering the transformations caused by the expansion of the Internet and the intensification of information flows. To this end, a bibliographical and theoretical approach is developed, based on doctrinal contributions related to privacy, data protection, information security, and technological transformation. The discussion highlights that privacy can no longer be understood as the right to prevent interference in the private sphere, since the digital environment also requires control mechanisms over the collection, processing, storage, and use of personal information. Similarly, information security is an indispensable element for reducing vulnerabilities and preserving attributes such as confidentiality, integrity, availability, and authenticity. It is concluded that technological advancement demands an integrated understanding of innovation, information flow, data protection, and the preservation of individual autonomy, in order to reconcile the development of the digital society with the protection of fundamental rights.

Keywords: Privacy. Protection of personal data. Information security.

ABSTRACT

The expansion of digital technologies and the increasing use of computer networks have profoundly transformed the ways in which communication, information exchange, and economic and social activities are carried out. In this context, personal data has acquired strategic importance, becoming relevant resources for organizations, users, and different business models, while also increasing challenges related to privacy, information security, and the protection of personality rights. This article aims to discuss the relationship between privacy, personal data protection, and information security in the context of the technological society, considering the transformations brought about by the expansion of the Internet and the intensification of information flows. To this end, a theoretical and bibliographic approach is adopted, based on scholarly contributions concerning privacy, data protection, information security, and technological transformation. The discussion demonstrates that privacy can no longer be understood solely as the right to prevent interference in one's private sphere, since the digital environment also requires mechanisms for controlling the collection, processing, storage, and use of personal information. Likewise, information security represents an essential element for reducing vulnerabilities and preserving attributes such as confidentiality, integrity, availability, and authenticity. It is concluded that technological advancement requires an integrated understanding of innovation, information flows, data protection, and individual autonomy to reconcile the development of the digital society with the protection of fundamental rights.

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1 INTRODUCTION

The evolution of digital technologies has significantly altered established relationships.
between individuals, organizations, and institutions. The expansion of internet access, the
development of computer networks and the increasing capacity for storage and
Information processing has led to data assuming a central role in the dynamics.
of contemporary society. Information that remained restricted to certain
Environments began to circulate rapidly and, often, on a global scale.
keeping pace with the expansion of activities carried out in digital environments.
This process has led to important advances in forms of communication and dissemination.
of knowledge, in the provision of services and in the development of new possibilities
economic and organizational factors. At the same time, there is a growing dependence on resources.
Technological advancements have brought new situations of vulnerability. The collection and processing of large amounts of data...
The volume of personal information, coupled with the interconnection of systems, has expanded the
possibilities for using the data have increased, but they have also intensified the risks associated with it.
Unauthorized access, exposure, sharing, and misuse of information.
In this scenario, privacy has acquired new dimensions. Traditionally associated with protection
From the private sphere and the right to prevent undue interference, it has also come to involve the
The possibility for an individual to exercise control over information that concerns them.
Technological transformation, therefore, has contributed to shifting the debate away from simple protection.
against interference in matters relating to collection, storage, treatment,
circulation and use of personal data.
The protection of personal data is related to the safeguarding of personality rights and
to the preservation of individual autonomy. The use of information capable of identifying
Directly or indirectly, a person can produce effects that go beyond the physical dimension.
strictly technological, reaching aspects related to freedom, dignity, image,
to privacy and self-determination. Therefore, the legal protection of data must be...
understood in conjunction with the technological mechanisms designed to ensure security.
of the information.
Information security has become an essential component of the connected society.
Interdependence between devices, systems, and networks promotes resource sharing.
and the circulation of information, but it also expands the surface area exposed to threats. In this

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context, principles such as confidentiality, integrity, availability, authenticity and non-conformity. Repudiation is important for preserving information and for the reliability of... digital environments.

The very evolution of the Internet demonstrates the magnitude of these transformations. Initially related to communication and computing infrastructure projects, the network became to constitute one of the main foundations of digital society, modifying processes communicational, organizational models, and forms of production and circulation of knowledge. Technological innovation, in this process, has ceased to represent only the creation new technical resources and began to influence the organization of economic relations and social.

Given this context, the present article aims to analyze the relationship between privacy, Personal data protection and information security in the face of the transformations caused through the expansion of digital technologies and the Internet. The aim is to understand how... The expansion of information flows and the increasing use of personal data impose new... Challenges to the protection of the private sphere and the security of individuals and organizations. To achieve this objective, the study develops a bibliographical and theoretical approach. bringing together contributions related to the concepts of personal data, information, privacy, Personality rights, information security, computer networks, the Internet and innovation. technological. The analysis starts from the understanding that technological phenomena cannot be examined in isolation, since their effects reach legal, social dimensions, economic and organizational.

The proposed discussion therefore stems from the need to understand the protection of privacy. and personal data as fundamental elements for the responsible development of Digital society. Technological advancement and innovation offer significant opportunities for the circulation of knowledge and the transformation of social and economic relations, but Its expansion must be accompanied by mechanisms capable of preserving the rights of individuals and ensure greater security in the handling of information.

2. THEORETICAL FRAMEWORK

2.1 Personal Data, Information and Protection of Personality in the Technological Society

The expansion of digital technologies and the increasing use of virtual environments.

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They have transformed personal data into one of the main elements related to contemporary discussions about privacy, security, and the protection of the human person. As New technologies have made it possible to collect, store, cross-reference, and... With the use of large volumes of information, it became necessary to establish mechanisms. legal mechanisms capable of limiting inappropriate uses and ensuring greater control by individuals over the data concerning them. In this context, Frazão, Oliva and Abílio (2019) highlight that Technological advancements and the consolidation of virtual spaces have contributed to expanding the debates about the protection of personal data, whose relevance goes beyond the dimension patrimonial and extends to the protection of fundamental personality rights.

To understand the legal protection afforded to personal data, it is necessary to distinguish the Concepts of data and information. Data can be understood as an element presented... in a raw state, which has not yet been subjected to an interpretation process capable of producing specific meaning. Oliveira (2014, p. 36) characterizes data as an identified element. in its original form, which does not allow one to understand a particular fact or circumstance. Understanding a given fact, therefore, does not depend exclusively on its ability to be... interpreted by a specific individual. A set of characters, symbols, or records can To constitute data even when its meaning is unknown to the observer. A An example of this situation can be found in records produced in writing systems or Languages that are no longer understood in contemporary times. The essential aspect lies in The possibility of the element being recorded, organized, and subjected to analysis processes. The systematic organization of these elements allows for their inclusion in databases and their subsequent use by computerized systems. Data structuring enables operations. automated storage, processing, cross-referencing, and retrieval activities that They have gained great importance with the expansion of computer systems connected to Internet (MALDONADO; BLUM, 2019).

The concept of information, although related to that of data, has a distinct nature. Setzer (2015, p. 31) understands information as an abstract construction endowed with meaning. for a given individual. From this perspective, while the data corresponds to the element which can be recorded and processed, the information results from an assignment process meaning, interpretation, or contextualization. This distinction is relevant for understanding. of contemporary data processing mechanisms, since different operations They can transform large, isolated datasets into insights capable of revealing... characteristics, behaviors, and patterns related to individuals.

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The legal importance of personal data has become even more evident with the transformation.
of the economic models made possible by digital technologies. The expansion of businesses
Based on the collection and processing of information, it allowed companies to use data from
These [products] help consumers identify preferences, behaviors, and consumption patterns.
Information has come to have economic and strategic value, and can be used in
formulation of products, services and commercial strategies (MALDONADO; BLUM, 2019).
In this scenario, data processing has become an issue related to the exercise of the profession.
of individual autonomy. Rodotà (2008) associates the management of personal data with the possibility of
the individual exercising control over the use of this information by third parties, considering
that the dataset provided can contribute to the construction of a
Digital representation of the person themselves. Data protection, therefore, is not limited to
preservation of secrecy or prevention of undue disclosure, also involving
possibility of the data subject's participation in decisions related to the use of information that
They concern you.

Although the contemporary discussion has been intensified by the development of the Internet.
and digital technologies, the legal concern with the collection and use of information
Personal matters did not arise in this context. In the Brazilian legal system, issues related to...
The registration, storage, and use of individual data were already being addressed, including in
within the scope of consumer relations. The Consumer Protection Code, for example, establishes
rules relating to databases and consumer registries, in articles 43 and 44,
demonstrating that concern about the use of personal information predates the current expansion.
of digital technologies.

The definition of what can be considered personal data, however, has significant implications.
importance in determining the extent of legal protection afforded to the individual. The question
is related, among other aspects, to the possibility of certain data allowing to
Identification of a person. In this field, the doctrine presents different interpretations.
Regarding the scope of the concept, more comprehensive approaches can be identified and
other more restrictive ones (MALDONADO; BLUM, 2019).

Bioni (2018) identifies two main perspectives in this debate. The first corresponds to
so-called expansionist bias, according to which protection can extend to related information.
to people who are identifiable, even if their identity is not determined.
The second, reductionist approach focuses on the situations in which the individual already finds themselves.
identified. The adoption of one perspective or another produces relevant consequences for the

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Defining the scope of legal protection afforded to data.

From a broader protection perspective, the expansionist concept proves to be
This is particularly relevant because it allows us to consider situations in which, although certain
Information that does not identify an individual, its combination with other available elements
This can make identification possible. This interpretation offers greater adaptability.
to the different forms of data processing that exist in technological environments, in which
Isolated pieces of information can be related and produce new identifying elements.
The application of this understanding can also be related to the principle of reasonableness.
used in the legal field as a tool for balancing rights and interests.
conflicting. Reasonableness allows the application of rules to take into account the circumstances.
specific details of each situation, avoiding rigid interpretations and enabling an assessment.
proportionality between the means employed and the intended purposes (MALDONADO; BLUM, 2019).

In this sense, the adoption of an expansionist understanding of personal data protection
It is compatible with the need to provide greater effectiveness to the protection of the individual.
In situations where non-identifiable information may, through association or
Processing, leading to the identification of a person, legal protection must take into account
This possibility. This approach allows one to keep up with the technological dynamics themselves, in
which increases the capacity for processing and cross-referencing information.

The discussion regarding the legal nature of personal data is also related to rights.
of personality. Initially, the problems involved the misuse of information.
Personal matters were often dealt with from the perspective of protecting privacy, intimacy, and...
private life. The central concern was to prevent aspects belonging to the private sphere from entering.
Private information belonging to an individual could be exposed or disclosed. With the development of technologies
In the digital world, however, data has come to play roles that go beyond simply exposing the world.
private life, making a broader understanding of its legal protection necessary.
(BITTAR, 2017).

Personality rights are linked to the very condition of being human and encompass
dimensions such as honor, image, intimacy, and private life. In this context, the protection of
Identity and information related to the individual takes on special importance.
Discussion about anonymity also falls within this field, although it presents a different treatment.
specific to the Brazilian legal system. Article 5, item IV, of the Federal Constitution.
It guarantees freedom of expression, but establishes that anonymity is not.

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Allowed.

Brazilian constitutional law therefore presents a relevant peculiarity when compared to certain understandings present in the European context, in which the Anonymity can be discussed from the perspective of protecting freedom of expression. In the Brazilian legal system, the constitutional prohibition remains explicit, without, however, removing the The need to protect the privacy, private life, honor, and image of individuals. At the sub-constitutional level, the Brazilian Civil Code also establishes protection for life. private. Article 21 states that the private life of a natural person is inviolable, conferring upon The Judiciary has the power to take measures to prevent or stop Acts that violate this protection. Thus, the existence of a legal system is observed. intended to protect the private sphere of the individual and to regulate the ways in which Information related to the person can be used.

Technological advancements, however, have made the relationship between privacy and privacy more complex. Anonymity and data protection. The ability to collect and process information on a large scale. Scaling allows different fragments of data to be combined to produce information capable of revealing specific aspects of identity, habits and A person's preferences. For this reason, contemporary legal protection of data Personal rights cannot be understood as a traditional extension of the right to privacy. The protection of personal data thus represents an essential dimension of data protection. Personality in technological society. The development of data collection mechanisms and Information processing requires legal instruments capable of ensuring transparency. control and responsibility in the processing of this data. Understanding the concepts of data, Information gathering, identification, and anonymization are therefore fundamental steps in analysis. the legal challenges arising from digital transformation and to understand the need for mechanisms capable of preserving the autonomy and fundamental rights of individuals.

2.2 Privacy in the Technological Society

Privacy occupies a central position among the issues related to the protection of dignity. Human reality, in the face of the transformations brought about by technological development. The challenges experienced in the 21st century differ from those observed at the beginning of the The 1990s, a period in which technology still had a significant presence in daily life. more limited scope. The progressive incorporation of technological resources into social relations.

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It expanded the possibilities for collecting, storing, circulating, and using information.
creating forms of vulnerability and demanding from the law responses compatible with that.
reality (LEONARDI, 2011).

The complexity of the concept of privacy stems, in part, from its use in different contexts.
areas of knowledge. The term may be associated with individual autonomy, confidentiality,
confidentiality, isolation, secrecy, anonymity, and the protection of the personal sphere. Their
The definition is not uniform and can take on different meanings depending on the context.
philosophical, legal, economic, social or individual perspective adopted.

This conceptual diversity makes it difficult to construct a single definition. Leonardi (2011)
note that many attempts to define privacy boundaries resort to the traditional method of
definition by related gender and specific difference, seeking to identify essential elements.
that allow this right to be distinguished from other legal categories. This methodology seeks
to establish a conceptual core capable of guiding the classification of certain situations.
concrete cases and their corresponding subsumption under legal norms.

The very language used to represent privacy demonstrates the breadth of
concept. Expressions such as secret, confidentiality, discretion, intimacy, and reserve can take on different meanings.
distinct and relate to different manifestations of the personal sphere. Lewicki (2003), by
For example, secrecy and confidentiality are associated with the protection of personal communications, while modesty...
It is related to the preservation of particular aspects of the individual. Doneda (2006), for her
In turn, it presents a variety of expressions used by the doctrine to address the phenomenon.
including private life, intimacy, secrecy, confidentiality, and privacy.

Terminological diversity can also be observed in comparative law. Different
Legal systems employ specific expressions to represent the protection of the private sphere.
reflecting their respective legal and cultural traditions. This multiplicity demonstrates that the
Privacy is not a static or universal concept, but an institution whose understanding...
It can vary according to the historical and social context in which it is analyzed (LEONARDI,
2011).

In a broad sense, privacy can be understood as the protection afforded to space.
personal matters of the individual and the dimensions of their existence that should not be subject to access
indiscriminate third parties. Costa Júnior (2007) relates the origin of the term to the English word.
privacy, while the doctrine uses different expressions to represent aspects
related to private life, intimacy, and autonomy.

This breadth, however, constitutes one of the characteristics and one of the main difficulties.

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of the concept. Mota Pinto (1993) considers privacy a term with high elasticity.
conceptual, whose precise delimitation presents considerable obstacles. The difficulty does not
It resides not only in the diversity of situations that can be considered private, but also
in the historical transformation of what each society understands as belonging
to the individual sphere.

From this perspective, privacy is related to the individual's ability to establish
boundaries between what you wish to share and what you intend to preserve within your sphere.
personal. This sphere can involve physical, psychological, relational, and informational aspects.
encompassing everything from the body and thoughts to information, choices, desires, and experiences.
Personal privacy. In this sense, privacy protection functions as a safeguarding mechanism.
in the face of undue external interference.

The absence of a clearly defined framework, however, can create difficulties in legal application.
from the institute. Leonardi (2011) observes that a comprehensive conception can include situations that
They should not be protected as private, whereas a restrictive definition may fail to...
to contemplate relevant manifestations of personal life. This difficulty becomes significant.
when the right to privacy needs to be weighed against other rights and interests
legally protected.

One of the perspectives used to understand privacy is related to limitation.
Third-party access to information, characteristics, and aspects of an individual's life. Schoeman
(1994) associates privacy with the existence of certain limits to access to the person, to their
information, their privacy, and their thoughts. This concept allows us to understand the
Privacy as a kind of control over the extent of individual exposure.

However, the simple idea of limited access is not enough to solve all situations.
related to privacy. Solove (2008) points out that not every form of access to a person
represents a violation, and it is necessary to consider which dimensions, information, or
particular aspects are involved. Therefore, another relevant question arises: to determine
What level or mode of access is sufficient to characterize interference?
legally relevant in the private sphere.

Historical conceptions of privacy also need to be understood within their context.
respective contexts. The perspective presented by Hannah Arendt (2007), for example,
It relates the distinction between the public sphere and private space to the social organization of society.
Greek. In this model, the family sphere had distinct characteristics from public life.
developed in the *polis.* Although historically relevant, this separation is not sufficient for

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To explain privacy in contemporary society.

Farias (2009) highlights that privacy has a historical and cultural nature, being influenced due to the social, economic, and political conditions of each period. Thus, that which in a given context was considered to belong exclusively to the private sphere. to acquire a different meaning in another social reality. The expansion of digital technologies This reinforces that observation, since the boundaries between public and private have become... progressively more complex.

One of the formulations used to explain the structure of private life is the Theory of Circles. Concentric aspects of the personality, developed in German doctrine by Heinrich Hubmann and

The theory, developed by Heinrich Henkel and discussed by, among other authors, Gonçalves and Rodrigues (2018), is a key theory. organizes the private sphere into different levels of protection, represented by circles. concentric circles encompassing private life in the strict sense, intimacy and, in its dimension The innermost secret.

The broadest sphere corresponds to private life in the strict sense, called *Privatsphäre.* It includes behaviors, relationships, and events that the individual does not want. to make public. It is, therefore, a sphere that has protection against exposure. improper, although it presents a lower degree of reserve than the more internal spheres (COSTA JÚNIOR, 2007).

This dimension can include certain information related to daily life and to the individual's relationships. The confidentiality of telephone data, for example, represents a This is a manifestation of the protection of private life, although its relativization may occur in certain situations. as provided for by the legal system and under the legally established conditions.

At a more restricted level lies the sphere of intimacy, related to relationships of trust and personal aspects shared with a small group of individuals.

This sphere may include conversations, events, and information that the data subject shares. only with family members, close friends, or professionals who have access to this data in reason for their activity, such as lawyers, psychologists and other professionals subject to duties confidentiality.

Within the most protected core lies the secret, which corresponds to the most reserved aspects of personality and whose knowledge is limited to the individual himself or to a circle. extremely restricted. The structure of the concentric circles therefore demonstrates that life Private life is not a homogeneous reality, presenting different levels of exposure and protection.

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The analysis of these different conceptions reveals that privacy has a nature...
multifaceted. It can simultaneously represent freedom, autonomy, restriction of access,
reserve and control, but it can also be related to contemporary problems of
surveillance, monitoring, and social control. For this reason, its understanding should not
to limit oneself to the idea of isolation or absence of external interference.

In the legal field, this multiplicity is of particular importance. Research on the
Privacy should be considered not only in its theoretical meaning, but also in its function as...
An instrument for the protection of the individual and the organization of legal relations. Recognition.
The recognition of privacy as a right consequently demands mechanisms capable of resolving...
situations in which this right conflicts with other constitutionally protected interests.
protected.

Traditional conceptions of the right to privacy were constructed in contexts in which
The circulation and storage of information had quite specific characteristics.
different from those observed currently. Solove (2004) draws attention to the need for
Rethinking the concept in light of the transformations brought about by digital society. The use
widespread use of communication technologies, computerized systems and connected platforms
It has profoundly changed the ways in which personal information can be produced.
stored and shared.

Historically, one of the best-known formulations of the right to privacy corresponds to...
The idea of the right to be left alone, associated with the work of Samuel Warren and Louis
Brandeis, published in 1890. The formulation represented an important milestone in the evolution of
Legal understanding of privacy, especially in light of technological transformations and
social aspects of that period (SOLOVE, 2008).

However, Warren and Brandeis did not establish an exhaustive and definitive definition for it.
The concept of privacy. The importance of their work lies primarily in consolidating the...
the idea that certain dimensions of personality should receive legal protection
against undue interference. Subsequently, different authors expanded on this concept,
incorporating new dimensions into the right to privacy.

Leonardi (2011) identifies, among the main conceptions related to privacy, the right
to be left alone, protection from external interference, secrecy and confidentiality, in addition to
The possibility of control over personal information and data. This evolution demonstrates the
a shift from a predominantly negative conception, associated with the absence of
interference, for an understanding that also includes the active participation of the individual.

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in managing their own information.

Doneda (2020) observes that the consolidation of privacy as a right occurred in a context of transformation of the very position of the human person in the legal system. With With the evolution of social and legal relations, the protection of personality has become increasingly necessary. instruments designed not only to prevent external interventions, but also to guarantee conditions for the exercise of individual autonomy.

In this process, privacy has acquired an informational dimension. Mendes (2014) highlights the The transformation of the institute, pointing out that privacy has moved from a conception... predominantly negative from a perspective related to the individual's control over your own information. This change is particularly significant in the digital society. in which personal data can be collected and processed even without direct exposure of the life of the recipient. intimate to the individual.

Rodotà (2008) also understands privacy from the perspective of control, relating- the possibility for the individual to manage their own information and participate in its definition beyond the limits of their personal sphere. This concept significantly expands protection. traditional, as it shifts the focus from simply prohibiting access to the decision-making capacity of The owner has control over their data.

Fernandes (1977), in turn, associates privacy with the possibility of preventing third parties have indiscriminate access to information, facts, and ideas related to the individual. From this perspective, protecting privacy involves defining limits for the circulation of information. elements that belong to the personal sphere.

Mulholland (2012) also notes that the contemporary concept of privacy has shifted to to encompass the protection of sensitive data and the possibility of controlling this information by its holders. This transformation demonstrates the progressive convergence between the right to privacy and the protection of personal data, especially in light of technological capabilities. large-scale collection and processing of information.

Lewicki (2003), in turn, relates privacy to the freedom to make personal choices. of an existential nature. From this perspective, protecting privacy also means ensuring to give the individual enough space to develop their personality and make decisions without undue external interference.

The subjective dimension of privacy is also highlighted by Ferraz Jr. (1993), for whom the Intimacy is directly related to individual choices and cannot be subjected to... Absolutely uniform patterns. The private sphere, from this perspective, represents a space

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of maximum exclusivity, in which the individual exercises their autonomy without needing to become
They make their choices public.

The difficulties in defining the term are also highlighted by Farias and Rosenvald (2012), who
They relate the concept to cultural differences, customs, and traditions that exist in each...
society. Tartuce (2014), in turn, emphasizes that the right to privacy does not have a character
absolute, and must be weighed against other constitutional rights and principles.

The effectiveness of this protection poses a particularly relevant challenge due to the frequency
with what information related to private life is exposed or used in a way
Inadequate.

Given this set of perspectives, it becomes clear that privacy cannot be reduced to
a single definition. It is a concept that presents philosophical, social, and other dimensions.
cultural and legal, and whose meaning changes according to historical conditions and
technological. The same characteristic that makes its delimitation difficult also allows the
The institute keeps pace with societal changes.

Despite doctrinal differences, two ideas are particularly relevant to the
Contemporary understanding of privacy: limiting access and control. The first says
respect for the protection of the individual against undue access by third parties to information and aspects
belonging to their personal sphere. The second involves the possibility of the holder themselves
to participate in decisions related to the disclosure and use of this information.

For the purposes of this study, privacy will be understood from these two dimensions.
complementary: restricting access to information and data related to the individual and the
The power of control exercised by the owner over its disclosure and use. This delimitation
It proves particularly suitable when the analysis is focused on data protection.
personal, as it allows considering both the defensive dimension of privacy and its
dimension of informational self-determination.

In contemporary society, the need to properly define the concept becomes...
even more evident. The recurring use of the term privacy in discussions about
Technology, personal data, and digital environments require sufficiently clear criteria to avoid...
that the institute is used in a generic way or applied inappropriately.

Privacy and the right to privacy therefore remain topics of constant relevance.
Its meaning is not necessarily static and may change throughout the person's life.
individual and vary according to the social and cultural circumstances in which a given situation occurs.
This is happening. The transformation of cyberspace has intensified this process, modifying relationships.

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RCMOS - Multidisciplinary Scientific Journal The Knowledge.
ISSN: 2675-9128. São Paulo-SP.

Year VI, v.1 2025 | Submission: 12/23/2025 | Accepted: 12/26/2025 | Publication: 12/29/2025

social issues and expanding on informational, communicational, ethical, and sociocultural matters. related to the exposure and control of information (SILVA; OLIVEIRA; FURTADO, 2019).

In this scenario, privacy protection becomes important not only for the preservation of in the individual sphere, but also for the very organization of social relations. In a A society in which the boundaries between public and private become progressively less defined. defined, especially in light of technological expansion, to ensure protection mechanisms and control over one's personal sphere is a relevant condition for autonomy, dignity and the free development of personality.

2.3 Information Security and Protection in Computer Networks

A computer network can be understood as a set of two or more interconnected computing devices with the purpose of enabling communication and resource sharing. For Costa, Silva and Cruz (2012), this type of structure It is characterized by the interconnection of systems and processing units, allowing for... Interaction between different technological devices and mechanisms.

Among the main purposes of computer networks is the sharing of resources. that allows users to utilize information, systems, equipment, and services in a way integrated. This feature can provide greater operational efficiency and reduced costs. costs. However, the interdependence between connected devices also This increases the need for protection mechanisms, since vulnerabilities or incidents that affect a particular component can produce consequences for other elements of network.

In this context, Information Security (IS) constitutes a set of principles and mechanisms designed to protect the information and resources used for its storage, processing and transmission. Peixinho, Fonseca and Lima (2013) highlight fundamental principles related to information security, including Confidentiality, integrity, availability, and non-repudiation. These elements can be... added to the authenticity, especially when analyzing identification mechanisms. of the entities that participate in the communications.

Confidentiality is associated with restricting access to information, ensuring that certain data or resources can only be used by individuals or entities.

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duly authorized. In shared environments, such as those based on
In cloud computing, this principle takes on special importance, since different
Users can simultaneously utilize storage and processing resources. In this
In this scenario, it becomes necessary to establish mechanisms capable of ensuring segregation.
adequate handling of information and protection of strategic data, intellectual property, and information.
of a confidential nature.

Integrity, in turn, is related to preserving the accuracy and consistency of...
information during its storage, processing, and transmission. The goal is to prevent
that the data be improperly altered, whether by intentional actions or otherwise.
resulting from system failures or vulnerabilities. In computing environments, ensuring
Integrity means ensuring that the information received or stored remains...
compatible with that originally produced or authorized.
Availability refers to the ability of authorized users to access information.
and resources when needed. This principle is directly related to
continuity of services, which is particularly relevant in systems where interruptions
They can compromise essential activities. In environments where data management
is carried out by third parties, issues related to information retrieval, redundancy and
Operational continuity becomes an important element in safety assessment.
Authenticity is related to the possibility of verifying the identity of entities.
involved in a communication or transaction. Authentication mechanisms allow
to establish whether a given user, device, or system actually corresponds to
Declared identity, helping to prevent unauthorized access and reduce risks.
associated with the fraudulent use of credentials.
The principle of non-repudiation, in turn, is related to the possibility of proving authorship.
of a specific action performed within a system. Its purpose is to provide evidence capable
to link an operation to the user or entity responsible for its execution, reducing the
possibility of subsequent contestation of authorship. Thus, non-repudiation maintains a relationship
directly linked to mechanisms for authenticity, registration, and auditability of activities carried out in
systems.

The application of these principles becomes particularly relevant in computing environments.
in the cloud. Castro and Sousa (2010) point out different risk situations related to
use of shared resources, including intrusions, violations of data protection standards
data, joint use of storage systems, information retrieval

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managed by third parties, authentication of communicating entities and the possibility of
Auditing the actions performed by users. These aspects demonstrate that security in
Connected environments depend on mechanisms capable of simultaneously preserving the
integrity, confidentiality, availability, authenticity and traceability of
operations.

Threats to network security can occur in different ways. Charity, Rabbit and
Alves (2013) generally distinguishes between active and passive attacks. In active attacks, the agent
malicious content directly interferes with communication or the content of information, and may
modify messages or compromise system resources. In passive attacks, on the other hand...
On the other hand, the intruder acts primarily in observation and information gathering, without necessarily
modify the transmitted data. Even without directly altering the content, this type of threat
This can allow for the acquisition of information that is subsequently used improperly.

Among the mechanisms employed to reduce these risks is cryptography, a technique.
designed to protect information by transforming it into a representation that
It makes access by unauthorized persons more difficult. The use of cryptographic mechanisms is
particularly relevant for the protection of data during its transmission and storage,
since it can reduce the risks associated with interception and unauthorized access to
information.

Cryptographic systems can use different key models, highlighting the
mechanisms based on public and private keys. In cryptographic systems
In an asymmetric configuration, the public key can be made available to other parties, while the asymmetric key...
Private information remains under the control of its respective owner. The combined use of these keys
It allows the establishment of protection mechanisms for communication and authentication of...
parties involved (VIANA; MENDES, 2008).

In this model, the public key can be used in operations intended to protect the
information, while the corresponding private key is kept confidential.

The security of the mechanism depends, among other factors, on the preservation of the private key and the
The use of appropriate cryptographic algorithms. In this way, cryptography does not represent
It is merely a way of concealing information, but it constitutes a technological resource.
important for ensuring security properties in different communication processes
digital.

Protecting information on computer networks, therefore, requires a combination of
different mechanisms and procedures. Simply connecting devices does not guarantee

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security, especially because communication between systems creates additional points of Interaction and, consequently, new possibilities for exploiting vulnerabilities. The Resource sharing must be accompanied by mechanisms capable of controlling it. Access control, information preservation, user identification, and activity logging. Network security should therefore be understood as an ongoing process of protection of devices, information and communications carried out in the environment connected. The adoption of principles such as confidentiality, integrity, availability, authenticity and non-repudiation, associated with the use of mechanisms such as cryptography, Authentication and auditing help reduce the risks arising from unauthorized access. Interceptions, unauthorized alterations, and unavailability of resources.
In this sense, the greater the integration between devices and systems, the greater the tendency to be. need to establish security mechanisms capable of protecting the different Infrastructure components. Information security in computer networks constitutes, therefore, an essential element to ensure the benefits provided by connectivity and that resource sharing is not accompanied by disproportionate levels of Exposure to threats and vulnerabilities.

2.4 Internet, Technological Transformation and Innovation in Contemporary Society

Communication is a fundamental need for organizing life in society and, throughout history, individuals have developed different tools and Technologies designed to expand the flow of information and overcome limitations. Space. The development of digital technologies represented an important step in this. The process, especially with the consolidation of the Internet, has changed in a significant way. significant forms of communication, interaction, access to information and achievement economic activities.

Although the Internet is often associated with interpersonal relationships and communication... In the daily routine and in conducting research, its importance goes beyond these functions. In business, the World Wide Web has become an important channel for The relationship between organizations, consumers, suppliers, and other economic agents. Connectivity has enabled new ways of disseminating information, marketing, and providing services. services and interaction with the market, progressively modifying traditional models of business.

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The origin of the Internet is related to initiatives developed in the context of needs.
Strategic and military strategies of the United States during the second half of the 20th century. According to
Sterne (2017), the first projects sought to create a communication structure capable of
to preserve and transmit information considered strategic even in the face of situations of
high vulnerability. The design of a distributed network was associated with the need
to avoid concentrating information in a single point, allowing it to be maintained in
different computers and locations.

During the 1970s, various initiatives contributed to the evolution of this.
infrastructure. Sandhusen (2006) highlights ARPANET, developed for the purpose of
to establish communication between defense-related institutions, and NSFNet, created
later to expand access to network infrastructure to non-affiliated institutions
directly to the military area. NSFNet played a significant role in the expansion of
connectivity and the formation of the structure that would later contribute to consolidation.
from the Internet.

Another key milestone occurred in the late 1980s, when Tim Berners-Lee
He developed the World Wide Web. Initially conceived to facilitate the sharing of
Information exchanged between researchers, the Web subsequently reached a much larger dimension.
broad, contributing to making Internet use accessible to different segments of the population.
society (SANDHUSEN, 2006; STERNE, 2017).

In Brazil, the process of expanding the Internet occurred later and was initially...
related to the academic environment. During the 1980s, the use of the network was
concentrated in educational and research institutions, and gradually expanded to other areas.
sectors of society as telecommunications infrastructure and access services
developed (SANDHUSEN, 2006).

The expansion of the Internet accompanied a broader process of technological transformation and
economic and social integration. The advancement of digital technologies has fostered closer ties.
between individuals, organizations, and different regions of the world, reducing geographical barriers.
for the circulation of information and for carrying out economic activities. In this scenario,
The Internet has come to perform functions related to communication, information, and interaction.
social and commercial activities, establishing itself as one of the main infrastructures of
digital society.

The speed of these transformations has also imposed on organizations the need for adaptation.
Continuous. Technological changes frequently alter consumption patterns and models of

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business, production methods, and competitive strategies. Consequently, companies and Other organizations need to develop the capacity to respond to new scenarios. incorporating technologies and seeking solutions capable of keeping pace with the transformations of economic and social environment.

In this context, innovation takes on a strategic role. Drucker (2002) relates innovation to entrepreneurial ability to identify opportunities arising from changes and transforming them into new possibilities for action. From this perspective, innovating does not mean not only to create something completely new, but also to modify, improve or reorganize. products, services, and processes in a way that can produce improvements and generate new results.

The contemporary definition of innovation also encompasses significant changes in business products and processes. According to the Oslo Manual (2018), an innovation business refers to a new or significantly new product or business process. improved in relation to the practices previously adopted by the organization, provided that it has has been effectively introduced to the market or put into use by the company.

This definition broadens the understanding of innovation, incorporating both the creation of new solutions. as well as the significant improvement of existing practices.

The relationship between innovation and economic development has been particularly influenced by The contributions of economist Joseph Schumpeter. In his approach, innovation occupies a prominent position. central to the dynamics of economic transformation, functioning as an element capable of To modify productive structures and generate new development opportunities. This This perspective breaks with the idea that economic stability necessarily depends on... preservation of existing models, recognizing change as an integral part of development process.

Schumpeterian notion of "creative destruction" represents precisely this movement of Transformation. The introduction of new technologies, products, processes, and business models. It can make certain previous practices less competitive or even replace them.

Thus, economic development occurs accompanied by processes of creation and replacement, in which new solutions continually modify existing structures. (MIRANDA et al., 2015).

The importance of innovation, however, is not limited to individual organizations. Knowledge and the capacity for innovation are relevant elements for... competitiveness of companies, economic sectors, regions and countries. In an environment marked Due to globalization and the rapid circulation of information, the capacity to produce and absorb...

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and applying technological knowledge can directly influence the competitive capacity of different economic agents.

Different forms of innovation can also produce distinct impacts on markets. Christensen, as discussed by Candido (2011), differentiates between sustaining innovations and Disruptive innovations. The first type is associated with the improvement of products and services. already existing, seeking to meet consumer needs and improve the performance of available solutions. These improvements can occur incrementally, allowing that Organizations continuously improve their products and processes without necessarily to radically alter the market in which they operate.

Disruptive innovations, on the other hand, have the potential to modify significantly impact markets and business models. They can introduce solutions initially targeted at specific or underserved segments and, subsequently, alter the existing competitive structure. This process can lead to the gradual replacement of Traditional models are being replaced by new forms of production, marketing, or service provision. (CANDIDO, 2011).

The circulation of information is one of the elements that favor this process of transformation. Individuals are continually exposed to information coming from different sources and means of communication, including newspapers, radio, television and, in each case, different media. increasingly significant, digital environments. Silva et al. (2015) highlight that contact A permanent display of diverse information can contribute to the generation of ideas and insights. that influence the identification of new possibilities.

The relationship between information, knowledge, and innovation, therefore, does not occur in a way... necessarily linear. The initial conceptions that represented innovation as a a sequential process, in which the knowledge produced in laboratories would later be transferred to the market, they were gradually replaced by approaches that recognize the existence of multiple interactions between companies, research institutions, consumers, governments and other social agents.

The innovation process can therefore be understood as a complex dynamic in which different flows of knowledge and information interact continuously. Changes Economic, technological, and social factors influence each other, leading to innovation. exhibit dynamic, discontinuous, and non-linear characteristics. Consequently, its Evolution cannot be explained solely by a predictable sequence of steps, a since new needs, technologies, knowledge, and market conditions can change

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constantly following the initially planned paths.

In this scenario, the Internet and digital technologies play a relevant role in expanding the The speed of information circulation and facilitating interaction between different agents. Connectivity allows knowledge to be shared and demands to be met. identified more quickly, and new solutions developed and disseminated in different markets.

Thus, the technological transformation brought about by the Internet should not be understood as... not just as an evolution of the means of communication, but as part of a larger process. broad economic, social, and organizational change. The combination of connectivity, The circulation of information, knowledge, and innovative capacity creates conditions for... The emergence of new products, services, processes, and business models makes innovation... an essential component of organizational adaptation and societal development contemporary.

CONCLUSION

The technological transformation that has occurred in recent decades has profoundly changed the way How information is produced, stored, processed, and shared. The expansion of The internet and computer networks have contributed to increasing the speed and reach of... Information flows, favoring communication, innovation, and the development of new technologies. forms of organization of social and economic activities. However, the same environment that While enabling greater connectivity also creates new forms of exposure and vulnerability.

In this context, it was found that the contemporary understanding of privacy goes beyond traditional concept related exclusively to isolation or protection against external interference. In the digital environment, preserving privacy also involves ensuring to give individuals the means to exercise control over information that concerns them, especially given the growing capacity for collection, storage, processing and Sharing of personal data.

The protection of personal data, in turn, is closely related to the protection of... personality and the preservation of individual autonomy. The use of information Personal issues can have consequences that extend to different dimensions of private life. This is why its protection should not be reduced to a merely technical matter.

Data processing requires a perspective that simultaneously considers the aspects

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legal, technological and social aspects involved in its use.

It was also observed that information security plays a fundamental role in this.
scenario. The increasing interconnectedness of systems and the dependence of organizations on them.
Digital networks make it essential to adopt mechanisms capable of preserving the
Confidentiality, integrity, availability, and authenticity of information. Resources
Technological tools, such as cryptography and authentication mechanisms, constitute instruments.
relevant, but security must be understood as an ongoing process, subject to
Constant adaptation in the face of evolving threats and technologies themselves.

The expansion of the Internet and innovation processes also demonstrates that development
Technological advancement and the protection of rights should not be treated as necessarily separate objectives.
incompatible. Innovation can expand opportunities for communication and circulation of
knowledge and economic and social development, provided it is accompanied by structures
adequate governance, security and protection of information.

Therefore, it can be concluded that the digital society demands an integrated approach to privacy.
of the protection of personal data and information security. The growing centrality of
Given the dynamics of contemporary life, it becomes necessary to develop practices capable of...
to reconcile innovation and technological development with respect for autonomy, dignity and
to the fundamental rights of individuals.

Finally, protecting privacy in the digital environment must be understood as an ongoing process of
adaptation to technological transformations. As new forms
The ways in which information is collected, processed, and circulated also change.
challenges related to the protection of individuals. In this sense, technological development
Responsibility depends not only on the ability to create and implement new solutions, but
also the construction of mechanisms capable of ensuring that innovation occurs in
A balance between protecting people's rights and safety.

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