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Faculty of Engineering, College of Farabi, University of Tehran, Old Qom-Tehran Road, Qom, Iran Phone Number:(+98-25)36166651

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ه ۱ تا ۱۴ آبان ۱ ه ۱۴ – دانشکده مهندسی دانشکدگان فار ابی دانشگاه تهر ان

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Approaches to an Information Gathering System Specified to Automobiles' Specifications

Behrad Farzadi ¹

¹Department of Knowledge and Information Science, Shahid Beheshti University, Tehran, Iran behrawd@protonmail.com

Abstract

Having to deal with huge amounts of data and information nowadays, has been kind of an issue for some people. This problem becomes more bothering when one would have to handle it while trying to use different types of services. Buying an automobile is one of the eras that has provided us with so much information that often making the right decision, would take us hours because of the gigantic amount of information we have to manage and analyze only to choose one vehicle. New methods of solving such problems require us to pay attention to similar systems that solve similar issues in different fields. To solve the car choosing problem, we can learn from the information gathering and retrieval systems, recommender systems and information representation systems in libraries. By having given certain requirements to (budget-wise), and having certain types of information, the system would be able to help us find the most suitable car to purchase faster, and more efficiently. This paper does a review on approaches to such a system for car specifications. Even though the discussed system might not seem necessary for both the buyers and the dealers, proposing an acceptable design for the system would make a big change in the process of choosing and buying vehicles.

Keywords: Information, Information Gathering, Information Retrieval, Automobile Specification.

1 Introduction

Transportation has always been one of the most important aspects of life in every culture and every society. This has not changed in the communication era. Different ways of transport and methods of moving (air travel, road travel, sea travel and below the surface travel) have led to the development of organizations that provide transportation services. However, people still tend to choose private vehicles if possible.

Among all different ways of transportation, automobiles are the most popular; Also, they are the cheapest when it comes to owning a private one. The process of choosing



the right automobile requires enough information to compare models and base the decision on a logical conclusion. This information often cannot be accessed easily, therefore, buyers may not be sure and confident enough about their choice. To solve this problem, there should be an information gathering system, working on automobile specifications; brand and country popularity for example. A country name (e.g., Japanese name) produces positive value to brands originating from particular countries. Long-term popularity positively influences brands' short-term market shares and marketing effectiveness [2]. This research will tend to review approaches to such a system.

2 Automobiles and Information-Related Systems In Libraries

Automobile (car) is a four or more wheels transportation that have many benefits for humanity, one of which can carry passengers and stuffs [3]. An information Gathering system is a system by which the user can search or browse different types of information about a specific subject. Such a system is used in different institutions and companies. Also, libraries use this type of system in a more specific way. The data collected for management information purposes by libraries can form the basis for a strategic information system [4]. Some libraries can fulfill information needs of their users by working with such systems a lot. In the information era that we are living in, librarians should be able to answer and fulfill information needs of the users and people who use library systems. Reference librarians apply critical-thinking skills, emotional intelligence, teaching ability, and question analysis to connect the user with appropriate resources [5]. More importantly a "Reference Librarian" has to be an expert in answering information needs and questions nowadays. To be able to do their job faster and more efficient, librarians use Information Gathering Systems¹ alongside Information Retrieval Systems² and Information Management Systems³. Using all of the above and sometimes by developing a recommendation system, librarians will be able to answer almost any question and fulfill almost any information need of the user. Same approach can be used for information gathering of automobiles and cars. We can develop information retrieval systems and recommendation systems to retrieve automobile related information faster and more beneficially.

3 Information

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Information exists in and is actually necessary for almost all professions, sciences, and cultures. With the accelerated development and increased impact of modern science and technology on society, the functions or effects of information on science and technology,

¹IGS ²IRS ³IMS



as well as society as a whole, is strengthening greatly. Therefore, information has been seen as an important and powerful force [6].

The word "information" has two main uses:

- a) Shannon's use [7] refers to a syntactic measure of communicable signals that ignores what the signals refer to, and
- b) The everyday use [8] refers to semantic content that is about something that actually exists or could exist.

Information has become a very popular word since the 1950s. It is widely used in people's daily life. It refers to messages, news, data, knowledge, documents, literature, intelligence, symbols, signs, hints, tips, and what is gathered by some special agencies [6]. To define the word information, we can have different approaches and there have been different definitions from different experts. However, in a simple explained way information is created when you add value to data. In any field of study, data is gathered and is cleansed; then it is managed and then one would retrieve different types of several data based on what they need. Then they review their data and would really think about it. Finally, they discover relations between different parts of the data. One would add this relational value to their data which will help understanding unknown aspects of the data they gathered. By knowing those aspects, they have created information. By thinking about this approach, we come to realize that information is not something to discover; yet it is something to create. Therefore, in an information gathering system or in an information retrieval system about vehicles, we don't need to gather data; we need to gather information. and we are working with information not data that needs to be cleansed, needs to be worked on and managed to get the information out of.

4 Customer Problems

The problem of car buyers while trying to decide for the best choice is that there are lots of different parameters that should be considered before deciding. Most of the times, buyers have to choose only one car because of financial situations or different aspects that don't let them decide freely and choose several vehicles. Also, because of the fact that different vehicles offer different options and features, different ranges of capacity and different types of services, it is really hard to choose only one automobile. You should keep in mind that different companies and car manufacturers represent different sorts of services and different classes of vehicles. As a matter of fact, to choose a specific vehicle, one has to know the amount of money they want to spend, what service they want to have, and also, they have to know which car manufacturers provide that type of service. It is important to note the fact that car manufacturers themselves will help you and provide you with important information that will help you to choose better what you want to purchase. Nevertheless, having an information gathering system that gathers car specifications will help you choose more efficiently and more precisely. We The First Conference on CYBERSPACE فراری فراری المالی المالی

should not forget the fact that cars are mostly daily used and people often spend a lot of time in it, therefore, it is really important to be precise while purchasing one.

5 Design of an IGS

Usually, information is acquired in a format that is only of restricted use [9]. Several factors are kept in mind while designing an information Gathering system; such as the energy required to retrieve the information that is needed, the time that should be spent to retrieve the information and the precision and relevance of the information that is retrieved. There are two main goals in designing such a system; one would be the gathering of information related to cars and vehicles' specifications and the other one would be to retrieve and represent the needed information for each individual buyer who is using the system. For the system to operate there might be a librarian or an information representing expert needed, otherwise the system can be designed in such a way that individual users can use them without any help of an expert; although there should be some manuals required for the user to learn how to use the system. The user should have three different information points ready before using the system:

- a) the budget
- b) the type of vehicle and
- c) the services that are required.

All different types of cars and models should be categorized in different ways so that the user can browse the specific category needed for them. Automobiles should be categorized in used and brand-new cars; they should be categorized by the manufacturer; they also should be categorized by their class and segment and platform. The system should be able to combine different categories into each other based on users' requests. For instance the system should be able to create a specific category for a user who needs a pickup truck and doesn't have enough money to buy a brand new one; therefore, the system should show a category of the segment of pickup trucks combined with the category of used cars; and based on the budget of the buyer different types of services in different manufacturers should be combined to the other two categories, and as a result there would be a used pickup truck manufactured by Ford or Chevrolet from 1990s category specifically for this individual user. He can also browse in different cars that have all those requirements in that category and see the best one based on the specific patent as provided by the system itself.

6 Information Provided by the System

In an ideal scenario the information provided by the system should include different aspects of vehicles and different types of specifications of different cars, categorized



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in several ways that has been described. Plus, all the information should be reliable which means they should either be provided by the manufacturers themselves or there should be experts on the subject who are focused to deny any unrelated or unreliable information. Information for each individual vehicle should include at least:

- Brand (manufacturer)
- Model
- Production date
- Platform type
- Segment
- Engine specification
 - Power
 - Torque
 - Highest rev count
 - Capacity
 - Air intake type (naturally aspirated, turbocharged, supercharged)
 - Cylinder count
- Feature specification
 - Luxury features (massagers, cold and heated seats...)
 - Safety features (abs braking systems, airbags count and positions...)
 - Performance features (traction control, launch control...)
- Price tag
- Modifications (if available)
- Drivetrain⁴

Using such information, the user will have a clearer view of the choices they have. Providing enough information might be easy but providing such information with considerable amounts of reliability is not as simple as it sounds; only true car manufacturers are able to provide the system with such reliable information. Otherwise, we need professional experts on each individual brand to provide us with that information and to reference all the information so that the buyer would realize that they are reliable enough to use. However, some of the details and specifications are so well known to everyone that they would be reliable because of this fact.

⁴where the drive axels are located

7 Ethical Facts

Keeping in mind the fact that the system is specifically designed for car buyers to choose and decide the best automobile possible for their situation -in which they want to buy a vehicle- it is understandable that reliable information is pretty much necessary, for if misinformation or disinformation is provided to the user, they would buy a car using their whole budget and there would be other better options for them, which is not ethically or professionally correct.

Speaking of ethics, we should keep in mind the fact that not all car manufacturers are happy to give out the information to the public and to such systems to provide the users; for sometimes those companies charge individuals for that type of information or they want to have the executive right to guide buyers on deciding on what vehicle they want to purchase. So before adding any information to our system, we have to make sure that the provider of that information or the creator of that specific car, is happy with us sharing that information with our users; otherwise, we should get in touch with the company or the manufacturer and come to an agreement on either paying them for that information or not using their information at all. However, car manufacturers should keep in mind that information being spread out to the buyers all around the world who are using our information gathering system is actually a positive point for them; because they will be able to get well known to different customers who might not be familiar with their car models and our system provides those customers with such information. So, the company will be known in that area. In other words, by using this information gathering system and by providing it with the information that is needed, some car manufacturers might be expanding the areas where they sell automobiles in. Wang and others believe: "Satisfaction with popular cars, which is often lower than that for unpopular cars, declines at a faster (slower) rate than satisfaction with unpopular cars when they are higher-priced (lower-priced). Therefore, both price and popularity have important moderating effects on the relationship between satisfaction and customer experience level" [10].

To design information gathering systems for the specific subject of cars' specifications to help our customers choose the most suitable car, faster and more efficient, we can get help from the methods used in recommendation systems of libraries and information retrieval systems in those places. we can also be guided from reference librarians or information representation experts. Designing such a system requires the help of computer programmers and people who are familiar with the retrieval algorithms and also experts in managing information and data fields. Different perspectives of such systems should be under consideration of different experts.

8 Conclusion

Considering the fact that a lot of new car manufacturers have been in the game in the past few years alongside the old ones, there are thousands of car models that each



individual can purchase. Depending on the needs and the requirements of the customer, several different individual specific cars can be suggested to them. To choose in a faster and more efficient way between all these models an information gathering system which is focused on cars specifications could be really helpful to the customer. Although this might not look necessary but it is really beneficial to have a system that can figure out the most suitable car for you based on requirements and specifications you gave it. Since not so many people and not so many users will use the system, it has not been in the center of attention for the past decades so proposing a new system and the definition of its design would really help this subject and this group of individuals who seek such a platform.

References

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- [1] A. Emadi, "Transportation 2.0," IEEE Power and Energy Magazine, 9(4), pp.18-29.
- [2] C. Koo Kim, "Brand popularity and country image in global competition: managerial implications" in Journal of Product & Brand Management, 4(5), pp.21-33.
- [3] G. Prabowol, M. Nasrun, RA. Nugrahaeni, "Recommendations for car selection system using item-based collaborative filtering (CF).," IEEE International Conference on Signals and Systems (ICSigSys), Bandung, Indonesia, 2019, pp. 116-119.
- [4] R. Adams, "Strategic information systems and libraries.," Library Management, 16(1), pp.11-17.
- [5] D. Zabel, J. Wolfe, T. naylor, and J. Drueke, "The role of the academic reference librarian in the learning commons," in Reference & User Services Quarterly, 50(2), pp.108-113.
- [6] Z. Yuexiao, "Definitions and sciences of information.," Information Processing & Management, 24(4), pp.479-491.
- [7] C. Shannon, "A mathematical theory of communication.," Bell System Technical Journal. 27, 379-423 and 623-656.
- [8] A. Sloman, "What's information, for an organism or intelligent machine? How can a machine or organism mean?," in: Dodig-Crnkovic, G., Burgin, M. (Eds.), Information and Computation. World Scientific Publishing Co.
- [9] J. Chappell, ZP. Demery, V. Arriola-Rios, and A. Sloman, "How to build an information gathering and processing system: Lessons from naturally and artificially intelligent systems.," Behavioral Processes, vol. 89, no. 2, pp. 179-186.
- [10] J. Wang, J. Du, Y. Chiu, and J. Li, "Dynamic effects of customer experience levels on durable product satisfaction: Price and popularity moderation.," Electronic Commerce Research and Applications, 28, pp.16-29.

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A Survey of Privacy Preserving Data Mining Approaches for Cyber Security

Qazaleh Sadat Mirhashemi¹, Mohammad Reza Keyvanpour²

¹Data Mining Laboratory, Department of Computer Engineering, Faculty of Engineering, Alzahra University, Tehran, Iran qzmirhashemi@gmail.com ²Department of Computer Engineering, Faculty of Engineering, Alzahra University, Tehran, Iran

keyvanpour@alzahra.ac.ir

Abstract

Recently, the amount of information is growing exponentially, so security and privacy protection have been a public concern for quite a long time. This data can be utilized in several fields, such as business, health care, and cybersecurity. Cyberspace is a virtual computer environment to ease online communication. Data mining applications can detect future cyber-attacks through analysis. Data mining techniques bring a number of privacy risks while also allowing users to access information that was previously hidden. However, there are various techniques and algorithms for data mining that preserve cyberspace and privacy for publishing data in data mining. These algorithms consist of perturbation and anonymization. In this paper, a framework has been developed for analyzing qualitative methods as a platform for data classification and evaluation based on the latest perspectives. Our aim is to present a systematic review of data dissemination methods to prevent cyber-attacks and privacy preserving data mining (PPDM) and provide a platform for qualitative comparison within this framework. Additionally, exposing existing method weaknesses is important for improving PPDM approaches and determining the appropriate methods according to the requirements of the fields to be studied.

Keywords: Cyber Security, Privacy Preserving Data Mining, Data Publishing, Perturbation, Anonymization.

1 Introduction

Combining and analyzing sensitive data from multiple sources offers considerable potential for knowledge discovery. However, there are a number of issues that pose problems for such analyses, including technical barriers, privacy restrictions, security concerns, and trust issues [1]. Cyber security is concerned with protecting computer and network

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systems from corruption due to malicious software, including Trojan horses and viruses. Data mining has also proven a useful tool in cyber security solutions for discovering vulnerabilities and gathering indicators for baseline, as shown in fig.1. Data mining is the process of identifying patterns in large datasets [2]. Data mining techniques are heavily used in scientific research as well as in business, mostly to gather statistics and valuable information to enhance customer relations and marketing strategies. Privacy preserving distributed data mining techniques (PPDDM) aim to overcome these challenges by extracting knowledge from partitioned data while minimizing the release of sensitive information. Numerous methods have been proposed in the field of privacy data mining [3]. These methods may lead to information loss or side effects, such as reducing the most recent classifications of perturbation and data usage. This article provides an overview of anonymization and perturbation techniques. Anonymization techniques prevent identifying the characteristics and identity of critical data to ensure privacy, while data perturbation techniques modify a piece of data or the entire dataset while maintaining the meaningful properties for creating data mining models [4]. This technique is chosen by some data owners since they do not want to expose their privacy. In the perturbation approach, there are two types of techniques: value-based perturbation and Multi-Dimensional Perturbation. It is a technique that maintains data privacy during data integration or before sending data to a data-mining program [5]. In this article, publishing techniques for privacy preserving data mining and a comprehensive overview of all the methods used so far are presented. We have attempted to provide the most comprehensive classification of the categories because in most articles available, only the steps of privacy preserving data mining are divided, whereas the following methods are not discussed. The aim of this article was to provide a brief description of each method, as well as a category for each method. This essay is organized as follows: After the introduction, a description of the research is provided in part two, followed by a classification of the various techniques in the next parts. The next part consists of evaluation criteria. Finally, at the end of the article, a list of the newest methods is provided based on recent research projects.

2 Related Works

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Confidentiality is the main problem that arises in a large set of data. In this case, PPDM protects the privacy of data mining and its purpose is to achieve reliable data mining results without disclosing sensitive information. In [6], privacy techniques are classified into two categories, the Anonymous and the perturbation approach. After analyzing each approach, their significant features were identified, but only a small number were examined in the classification of methods. This paper provides an overview of existing privacy techniques, such as perturbation, anonymization and analyzes their strengths and weaknesses in various contexts [7],[8]. Privacy preservation is divided into the following types: Privacy preservation data mining (PPDM), Privacy preservation data publishing (PPDP), Privacy-preserving distributed data mining (PPDDM), and privacy





Figure 1: Conventional cyber security system [2]

preserving social network data publication (PPSNDP) [9]. Anushree Raj and Rio G.L. D'Souza have also said that two types of privacy attacks, called record linkage and attribute linkage, are prevalent. Several techniques are presented to preserve privacy [10]. According to Alpa Shah, the essence of PPDM lies in anonymization, perturbation, cryptography, fuzzy logic, and neural networks. Perturbation-based approaches have been discussed in [11]. It is also said that the data perturbation Approach is divided into two groups: the approach to probability distribution and the approach to value distortion. This paper aims to provide a complete and comprehensive classification of perturbation-based and anonymization-based algorithms according to the latest updates on data mining privacy. It also seeks to come up with an acceptable basis for more accurate classification and evaluation of data mining privacy techniques.

3 Algorithms and Techniques

To carry out data mining based on the desired results, complexity, and data properties, various used algorithms and techniques, including Association Regulation Learning, Classification, clustering, regression and outlier analysis [12] are explained in fig. 2.

3.1Association Regulation Learning

This is also known as dependency modeling or market basket analysis. It is used to discover relationship rules and correlations between variables. The purpose of association rule mining algorithms is to identify relevant relationships between variables in a dataset [13].





Figure 2: Various Data Mining Techniques

3.2 Classification

A classification algorithm is a powerful tool for analyzing and categorizing large amounts of data. It also enters data into a group belonging to a public class. It also enters data into a group belonging to a public class. This is also known as supervised classification [14].

3.3 Clustering

A clustering algorithm, known as Unsupervised classification, finds and creates groups of data elements that are similar [15]. Since each cluster can be considered as a class without a label, clustering is also known as automatic classification or classification that learns from observations rather than a training set [16].

3.4 Regression

A regression algorithm looks for a function that models the data with the fewest possible errors. Although algorithms have been created for a variety of tasks (such as clustering, association-rule mining, and classification), only two parties remain in the case of regression. The most interesting point about this algorithm is that it will keep the answer variable private [17].

4 PPDM Techniques for cyber security

Despite that, information discovered by data mining can be very valuable to many applications, people have shown increasing concern about the other side of the coin, namely the privacy threats posed by data mining [18].New strategies are discovered in PPDM to provide privacy for data mining knowledge. Furthermore, the process of knowledge discovery should not be impeded due to privacy. PPDM's major purpose



is to create algorithms that modify original data in several ways so that personal data remains private even after mining [19].

4.1 PPDM Techniques

There are several methods and a number of proposed conservation techniques to preserve privacy. Most techniques use some form of transformation in the main dataset to preserve privacy [20]. In this paper, the current techniques are divided into two general categories: perturbation and anonymization (fig.3).

Perturbation is a procedure for maintaining information confidentiality. This technique modifies the value of records without altering the significance of the input data Research shows that rotation disorders, projection disorders, and geometric data disorders are the three types of approaches to data disruptions [21]. The summary of these three types of data Perturbation is presented in Table 1.Anonymization refers to an approach where identity or/and sensitive data about record owners are to be hidden.

4.2 Cyber security

Cyber security is the set of technologies and processes designed to protect computers, networks, programs, and data from attack, unauthorized access, change, or destruction. Cyber security systems are composed of network security systems and computer (host) security systems [22]. Data mining has also proven a useful tool in cyber security solutions for discovering vulnerabilities and gathering indicators for baseline. In this paper, we will focus on privacy preserving Data mining approaches for cyber security.

4.2.1 Value-based Perturbation

This will be explained in detail to preserve statistical characteristics and column distributions. Value-based Perturbation is caused by:

Random Rotation perturbation	Geometric Perturbation	Random Projection perturbation
R*X = Y	RX + T + D = Y	$A^*X = Y$
For all three formulas, X is the original dataset. For all three formulas, Y is the perturbed dataset. The random rotation matrix is denoted by the letter R.	The secret rotation matrix is denoted by the letter R. (preserves Euclidean distances) The secret random translation matrix is denoted by the letter T. The secret random noise matrix is denoted by the letter D.	The random projection matrix is denoted by the letter A.

Table 1: Summary	of different	Data Per	turbation	Types	[23]
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Figure 3: Privacy preserving data mining approaches for cyber-security

Random Noise Addition. This method is based on the fact that data owners may not want to preserve all values in a record equally [8]. We consider the original values (x_1, x_2, \ldots, x_n) in a column to be drawn arbitrarily from a random variable x with a distribution. The randomization process alters the original data by adding random noises R to the original data values (Y = X + R in column Y). It then makes the resultant record $(x_1 + r_1, x_2 + r_2, \ldots, x_n + r_n)$ public [24].

Randomized Response. As a technique developed in the statistical community, the RR scheme is designed to collect sensitive information from individuals in a way that interviewers and the data processors are unaware of the two alternative questions answered by the respondents [25].

Uniform Perturbation. To ensure that individual values are hidden during data collection, data providers can alter the value of each data item or attribute separately before sending it to collectors in two ways. 1.Addition fixed data perturbation or substituting an attribute value with a new one, 2. Generalizing the data values or aggregating based on the related domain hierarchy [26].



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Figure 4: Data Micro Aggregation Perturbation Model [30]

Probability Distribution. This method endeavors to preserve data privacy for individuals by reconstructing the distributions. The point of this approach is that the owner of the data set publishes the resulting tuples by x_{i+r} instead of $x_i(x_1, x_2, \ldots, x_n)$. x_{i+r} is the original data value of a column (one-dimensional distribution) and is drawn from a random variable x and a random value of a certain distribution r [27].

Data Aggregation. This PPDM technique exposes aggregated data and allows the evaluation of particular aggregate query functions in the procedure of concealing an individual record [28].

Data Swapping. The values in distinct records are modified in data swapping strategies to ensure privacy in data mining. The lower half of the data is kept intact and is not impacted in any way, which confirms this method's benefit. As a result, certain general calculations can be performed without jeopardizing data privacy [29].

Data Shuffling. In addition to preserving summary statistics, data shuffling minimizes the risk of exposing confidential variables (X), a risk beyond that already present in the original data [31].

Data Masking. In this method, original sensitive attributes are restored with symbols like 'or' and '+'. It is very similar to the data blocking method but in this method, symbols are used for masking attributes [28].

Data Merging. The common approach to achieving data merging is sharing aggregated data rather than the subject's personal data [32].

Data Blocking. Methodology for falsifying association rules can be complicated by introducing unknown values into data. When uncertain values are entered, the Values of support and trust will fall within a certain range rather than a fixed number. It



means that important association rules are obscured by the final results set [33]. When data is given for mining, a blocking-based strategy suggests hiding certain sensitive information.

4.2.2 Multi-Dimensional Perturbation

The purpose is to hold Multi-Dimensional information. Multi-Dimensional Perturbation is caused by: **Data Mining Task-based Perturbation**. Data mining techniques modify the original data in a way in which the preserved properties can be utilized for tasks specific to data mining or even a particular model [34].

Condensation. This is one of the PPDM techniques that uses a methodology that condenses the data into various classes of the same size. The higher the indistinguishability level, the higher the amount of data privacy. Every group has at least a k value which alludes to the level of indistinguishability [34].

Multiplicative Transformation. Before publishing, the data owner perturbs the data using the multiplicative data perturbation method. The multiplicative data perturbation is a combination of random rotation and fuzzy logic. The original data is given as input to multiplicative data perturbation and obtains perturbed data as output [35].

Distance Perturbation. It also provides a high level of guarantee on data utility, particularly in terms of classification and clustering. As long as distance or inner product are preserved in data mining models, perturbed data will have the same accuracy as original data if such information is preserved [34].

4.2.3 Dimension Reduction-based

Data dimension-reduction-based strategy is an effective way to reduce data size in such a manner that it is compact and provides lower input data dimensions while keeping its geometric structure [36].

Dimension Reduction-based is caused by: Non-negative Matrix Factorization (NMF). The NMF [37] method uses nonnegative constraints to obtain a matrices-based data representation. The NNF matrix (Equation (1)) is as follows:

$$A_{n \times m} = W_{m \times k} \times H_{k \times n} \tag{1}$$

In which W and H are nonnegative matrices of dimensions $m \times k$ and $k \times n$, respectively.

Singular Value Decomposition (SVD). A noted method of dimension reduction in data mining is the SVD [38]. M is the original matrix, while n represents records and m represents attributes. Equation (2) is as follows:

$$M = u\Sigma vT \tag{2}$$



U is an $m \times n$ orthogonal matrix, Σ is an $m \times n$ diagonal matrix whose diagonal elements are positive, and VT represents an $m \times n$ normal orthogonal matrix [39].

Normally Distributed Noise (NDN). As a result of this method, M is added to a noise matrix (Tu) with the same size and normal distribution. The matrix dimensions of Tu and M are the same. Tu's elements are arbitrary values with a standard deviation and a mean parameter. The distributed matrix Equation (3) is as follows [39]:

$$\bar{M} = M + Tu \tag{3}$$

NMFSVD. This method sequentially decomposes the initial matrix using NMF and SVD. The algorithm is too time-consuming, and the change of the data space distance results in undesired privacy protection [40].

4.2.4 Anonymization Approach

This method creates a system in which individual records cannot be distinguished from groups of records by data generalizing and suppressing [40].

The Anonymization Approach is caused by:

K-Anonymity . The k-anonymity approach is an extensively applied and recognized privacy technique [41]. The K value is used as a measure of privacy. The lower the K value, the lower the probability of anonymizing.

L-Diversity. This method saves k values in addition to a variety of sensitive characteristics about each group to prevent homogenous attacks [42].

T-Closeness. As a result of the disadvantages of the L technique, the T-Closeness Approach was developed. Using the T- Closeness technique, the space between a sentient property's distribution in an unknown group and its distribution in the entire table should not exceed the threshold t [42].

P-Sensitive. As an extension of k-anonymity, the p-sensitive model addresses several shortcomings of this model. It considers several sensitive attributes that must not be disclosed. Although initially designed to protect against homogeneity attacks, it also performs well against different types of background attacks [43].

M-Invariance . M-Invariance is a fundamentally privacy-preserving concept in microdata republication. Unfortunately, the existing generalization-based m-Invariances require changing microdata for big data releases. This leads to problems with data utility loss and poor querying performance [43].



5 Evaluation of Privacy Preserving Data Mining Techniques

Privacy measurement is difficult due to the lack of a single and universal definition. However, some metrics have been proposed in the context of PPDMS. Unfortunately, there is no such thing as a single metric because some parameters can be evaluated. The existing metrics can be categorized into three groups that are different in PPDM aspects that are being assessed: 1. Data quality metrics that calculate the loss of data 2. A complexity metric that measures a technique's efficiency and scalability 3. Privacy level metrics that measure how safe data is from the standpoint of disclosure. Metric results make similar evaluations, but the assessment is carried out through data mining outcomes developed with changed data. The following subpar presents a survey of PPDM metrics regarding the privacy level, data quality and complexity [43].

5.1 Privacy Level

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The goal of PPDM is to maintain a certain level of privacy while maximizing the data's usefulness. According to data privacy metrics, the original sensitive data can be deduced from the altered information that results from using a privacy preserving approach [43]. The average conditional entropy measure is presented based on the information entropy idea to address the issue of not including the original data distribution [44]. The conditional differential entropy of X, h(X|Z), is obtained from equation 4. in which $f_X()$ and $f_Z()$ are the X and Z density functions, respectively.

$$h(X|Z) = -\int_{\Omega_{x,z}(x,z)} f_{x,z}(x,z) \log_2 f_{x|z}(x) dx dz$$
(4)

A key privacy statistic is the hidden failure (HF), which is used to assess the balance between privacy knowledge discovery and security. The ratio of the hidden patterns compared to the original information hidden as a privacy- preserving method is known as the hidden failure [44] and is derived from Equation 5.

$$HF = \frac{\#RP(D')}{\#RP(D)} \tag{5}$$

In this equation, HF stands for hidden failure, D and D stand for sanitized and original data sets, respectively. #RP() stands for the sensitive Patterns. All sensitive patterns will be properly hidden if HF = 0, but no sensitive information will be lost in the process [45].

5.2 Data Quality

Data quality is frequently harmed by privacy-preserving measures. Data quality measurements (also known as Metrics of functionality loss) try to determine the extent of

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Technique	Advantages	Limitations
Techniques according to perturbation	-Scalable -Efficient -In this technique different attributes are preserved independently	-Original data values cannot be regenerated. -Loss of information
Techniques according to anonymization	-Hide records with -Identity or sensitive data about record owners are to be hidden	-Linking attack. -Heavy loss of information

 Table 2: Advantages and Limitations of PPDM Techniques

the utility loss. In most cases, the measurements are conducted by analogizing outputs of a function to the original data and the privacy maintained altered information [45].

A metric is defined for determining the accuracy of any reconstruction algorithm (such as randomization) [44]. The authors calculate the amount of data loss by comparing the reconstructed and original distributions using Equation 6, in which $f_x(x)$ is the original density function, and \hat{f} is the reconstructed density function.

$$I(f_x(x), \hat{f}_x(x)) = \frac{1}{2} E[\int_{\Omega_x} |f_x(x) - \hat{f}_x(x)| dx]$$
(6)

The MC is a metric that counts how often patterns were hidden when they shouldn't have. As expected, during privacy protection process, no sensitive Patterns were re-lost [45]. This metric is obtained from Equation 7, in which Rp(X) stands for the number of non-restrictive patterns found in database X.

$$MC = \frac{\# \sim Rp(D) - \# \sim Rp(D')}{\# \sim Rp(D)}$$
(7)

5.3 Complexity

The efficiency and the implemented algorithm's scalability are the most important aspects of the PPDM approach complexity. Metrics can be utilized for resource consumption, such as time and space to quantify efficiency. All algorithms use these measures. A brief overview is provided here [45].

6 Discussion and Conclusion

Privacy models that cleanse data are used to achieve data publication privacy. However, attackers may attempt to anonymize or infer sensitive information due to access to other publicly accessible sources Modeling background information on adversaries presents a number of challenges as the amount of published data keeps increasing in quantity and complexity. These challenges include determining what data can be used to deanonymize and the number of public data sources that can be linked together. This

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Table 3: Techniques for Data Mining that Preserve Privacy Analysis and Comparison Methods

Methods	Scenario	Criteria					
		Lots of computation	Privacy preservation	Accuracy of mining	Scalability		
Anonymization	Central Commodity	Low	Average	Average	Average		
Perturbation	Central Commodity and Distributed	Low	High	High Low Average	High		

Table 4: Comparison of Perturbation-Based Privacy Techniques

Methods	Processing	Advantages
Uniform Noise Distorted	A uniformly determined perturbation matrix is added to the initial matrix	It is easy to use and has a high addition noise efficiency
Normally Noise Distorted	Add randomly selected noise values to the initial matrix	Add noise based on attribute value, randomness is strong
Singular Value Decomposition	In the original matrix of higher latitude, three matrix multiplications are required	Clustering is based on spatial distance and similarity between data
Non-negative Matrix Factorization	Dividing the initial matrix into two matrices and multiplying them	Optimization problems have a much lower computational overhead than SVD
Min Max Normalization	Normalize attribute values at uniform intervals	The prediction accuracy rate of normalization, standardization, and data mining
The NMFSVD	In this method, the initial matrix is successively decomposed by NMF and SVD	It is difficult to reconstruct the initial matrix, and it also has a high mining accuracy



necessitates the creation of more sophisticated and accurate adversarial background knowledge models, which can stimulate research on privacy safeguards that are effective against them.

In privacy preserving data mining, the key objective is to come up with a new algorithm that will hide or protect sensitive data from unauthorized parties. This paper presents a framework based on data publishing for categorizing and evaluating Privacy Preserving Data Mining methods. To begin with, these techniques were divided into two classes of anonymization and perturbation, and their key characteristics were examined. The perturbation process has an impressive computation cost efficiency, but it is difficult to achieve a balance between privacy and accuracy in data mining results. The purpose of this study is to review a wide range of privacy preserving data mining methods and their existing approaches. In this paper, the current state of privacy preserving techniques and cyber space in data mining discussed. We hope that the review presented in this paper can offer researchers different insights into the issue of privacy-preserving data mining, and promote the exploration of new solutions to the security of sensitive.

References

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- Chang Sun, Lianne Ippel, Andre Dekker, Michel Dumontier and Johan van Soest, "A systematic review on privacy-preserving distributed data mining," Data Science, pp.121– 150, 2021.
- [2] Prof. K. P. Barabde and Prof. V. Y. Gaud, "A SURVEY OF DATA MINING TECH-NIQUES FOR CYBER SECURITY," vol. 6, 2019.
- [3] Supritha S, Sushmitha S, and Basavaraju S, "Privacy-Preserving Data Mining: Methods, Metrics and Applications," vol. 2, 2018.
- [4] R. Raj and V. Kulkarni, "A Study on Privacy Preserving Data Mining: Techniques, Challenges and Future Prospects," IJIRCCE, vol. 3, no. 11, 2015.
- [5] Hina Vaghashia and Amit Ganatra, "A Survey: Privacy Preservation Techniques in Data Mining," International Journal of Computer Applications, vol. 119, no. 4, 2015.
- [6] M. Keyvanpour and S. Seifi Moradi, "Classification and Evaluation the Privacy Preserving Data Mining Techniques by using a Data Modification-based Framework," International Journal on Computer Science and Engineering (IJCSE), 2011.
- [7] Negar Nasiri and MohammadReza Keyvanpour, "Classification and Evaluation of Privacy Preserving Data Mining Methods," IKT, 2020.
- [8] Negar Nasiri and MohammadReza Keyvanpour, "Classification and Evaluation of Privacy Preserving Data Mining Methods," IJCTI, vol. 12, no. 3, 2020.
- [9] Anushree Raj and Rio G.L. D'Souza, "Survey on Anonymization of Privacy Preserving Data Publishing," Computer Science and Engineering Department, vol. 3, 2018.
- [10] Sri Satya Sai, Bhopal Indore Roa and Madhya Pradesh, "Efficient Model for Privacy Preserving Classification Of Data Streams," vol. 12, no. 2, 2021.
- [11] Sangavi N, Jeevitha R, Kathirvel P and Dr. Premalatha K, "RANDOM DATA PERTUR-BATION TECHNIQUES IN PRIVACY PRESERVING DATA MINING," (IRJET), vol.7, 2020.



- [12] Balkis Abidi, Sadok Ben Yahia and Charith Perera, "Hybrid microaggregation for privacy preserving data mining," Journal of Ambient Intelligence and Humanized Computing, 2019.
- [13] G Ravi Kumar , Dr. Harsh Pratap Singh and Dr. N.Rajasekhar, "Security and Privacy Protection in Datamining," vol. 12 , no. 2, 2021.
- [14] Supritha S, Sushmitha S, Dina Asghar and Kamal Mohan, "Privacy-Preserving Data Mining: Methods, Metrics and Applications," An International Journal, vol. 2, 2018.
- [15] Parul Agarwal, M. Afshar Alam and Ranjit Biswas,"Analysing the agglomerative hierarchical clustering algorithm for categorical attributes," International Journal of Innovation, Management and Technology, vol. 2, no. 2, 2010.
- [16] RICARDO MENDES and JOAO P. VILELA, "Privacy-Preserving Data Mining: Methods, Metrics, and Applications, vol. 5, 2017.
- [17] J. Dwivedi, "Various Aspects of Privacy Preserving Data Mining: A Comparative Study," International Journal of Engineering Research in Current Trends, vol. 1, no. 1, 2019.
- [18] LEI XU, CHUNXIAO JIANG, JIAN WANG, JIAN YUAN, and YONG REN, "Information Security in Big Data: Privacy and Data Mining," vol. 2, 2014.
- [19] Alpa Shah and Ravi Gulati, "Privacy Preserving Data Mining: Techniques, Classification and Implications-A Survey," vol. 137, no. 12, 2016.
- [20] Mrs. Suchitra Shelke and Prof. Babita Bhagat, "Techniques for Privacy Preservation in Data Mining," International Journal of Engineering Research & Technology (IJERT), vol. 4, 2015.
- [21] Benjamin Denhama, Russel Pears and M. Asif Naeema, "Enhancing random projection with independent and cumulative additive noise for privacy-preserving data stream mining," vol. 152, 2020.
- [22] Anna L. Buczak and Erhan Guven, "A Survey of Data Mining and Machine Learning Methods for Cyber Security Intrusion Detection," vol. 18, no. 2, 2016.
- [23] G. Srinivas Reddy, "DATA PROCESSING THROUGH AN ADDITIVE ROTATIONAL PERTURBATION TECHNIQUE IN A SECURED ENVIRONMENT OF PPRIVACY," vol. 9, no. 2, 2021.
- [24] M.Mohanrao and Dr.S.Karthik, "Perturbation Based Privacy Preserving Data Mining," SSRG International Journal of Computer Science and Engineering (ICRTESTM), 2017.
- [25] Musavir Hassan, Muheet Ahmed and Majid Zaman, "An Ensemble Random Forest Algorithm for Privacy Preserving Distributed Medical Data Mining," International Journal of E-Health and Medical Communications, vol. 12, 2021.
- [26] MOHAMMED BINJUBEIR, ABDULGHANI ALI AHMED, MOHD ARFIAN BIN IS-MAIL, ALI SAFAA SADIQ AND MUHAMMAD KHURRAM KHAN, "Comprehensive Survey on Big Data Privacy Protection," vol. 8, 2020.
- [27] Tanzeela Javid, Manoj Kumar Gupta and Abhishek Gupta, "A hybrid-security model for privacy-enhanced distributed data mining," vol. 34, pp. 3602-3614, 2022.
- [28] Ajmeera Kiran and Dr. D. Vasumathi, "Data Mining: Random Swapping based Data Perturbation Technique for Privacy Preservingin," International Journal of Recent Technology and Engineering (IJRTE), vol. 8, 2019.
- [29] D. Laskar and G. Lachit, "A Review on Privacy Preservation Data Mining (PPDM)," International Journal of Computer Applications Technology and Research, vol. 3, no. 7, 2014.



- [30] V. Jane Varamani Sulekha and Dr. G. Arumugam, "PMA for Privacy Preservation in Data Mining," (IJERT), vol. 6, 2017.
- [31] Han Lia, Krishnamurty Muralidhar and Rathindra Sarathy, "The Effectiveness of Data Shuffling for Privacy-Preserving Data Mining Applications," vol. 8, 2014.
- [32] Athos Antoniades, ohn Keane, Aristos Aristodimou, Christa Philipou, Andreas Constantinou, Christos Georgousopoulos, Federica Tozzi, Kyriacos Kyriacou, Andreas Hadjisavvas, Maria Loizidou, Christiana Demetriou and Constantinos Pattichis, "The effects of applying cell-suppression and perturbation to aggregated genetic data," (BIBE), 2012.
- [33] Lokesh Patel and Prof. Ravindra Gupta, "A Survey of Perturbation Technique For Privacy-Preserving of Data," vol. 3, 2013.
- [34] Desmond Ko Khang Siang, Siti Hajar Othman and Raja Zahilah Raja Mohd Radzi, "Comparative Study on Perturbation Techniques in Privacy Preserving Data Mining," vol. 8, 2018.
- [35] Thanveer Jahan , G. Narasimha and V. Guru Rao, "A Multiplicative Data Perturbation Method to Prevent Attacks in Privacy Preserving Data Mining," no. 1, 2016.
- [36] J. Hyma, P. S. Varma, S. N. K. Gupta and R. Salini, "Heterogeneous Data Distortion for Privacy-Preserving SVM Classification," In Smart Intelligent Computing and Applications. Springer, Singapore, 2019.
- [37] Tao Li, Yongzhen Ren, Yongjun Ren, Lina Wang, Lingyun Wang and Lei Wang, "NMF-Based Privacy-Preserving Collaborative Filtering on Cloud Computing," 2019.
- [38] Afsana Afrin, Mahit Kumar Paul and A. H. M. Sarowar Sattar, "Privacy Preserving Data Mining Using Non-Negative Matrix Factorization and Singular Value Decomposition," EICT, 2019.
- [39] Jinzhao Shan, Ying Lin and Xiaoke Zhu, "A New Range Noise Perturbation Method based on Privacy Preserving Data Mining," IEEE International Conference on Artificial Intelligence and Information Systems (ICAIIS), 2020.
- [40] Guangfu Chen, Chen Xu, Jingyi Wang, Jianwen Feng and Jiqiang Feng, "Nonnegative matrix factorization for link prediction in directed complex networks using PageRank and asymmetric link clustering information," vol. 148, 2020.
- [41] Ruoxuan Wei, Hui Tian and Hong Shen, "Improving k-anonymity based privacy preservation for collaborative filtering," vol.67, pp. 509-519, 2018.
- [42] Rupali Gangarde, Amit Sharma, Ambika Pawar, Rahul Joshi and Sudhanshu Gonge, "Privacy Preservation in Online Social Networks Using Multiple-Graph-Properties-Based Clustering to Ensure k-Anonymity, l-Diversity, and t-Closeness," vol. 10, 2021.
- [43] R.KAYALVIZHI and Dr. K. RAMESHKUMAR, "PRESERVATION TECHNIQUES IN DATA MINING," vol. 8, 2019.
- [44] LILI ZHANG, WENJIE WANG and YUQING ZHANG, "Privacy Preserving Association Rule Mining: Taxonomy, Techniques, and Metrics," vol. 7, 2019.
- [45] Gayathiri. P and Dr. B Poorna, "Association Rule Hiding for Privacy Preserving Data Mining : A Survey on Algorithmic Classifications," vol. 12, no. 23, 2017.

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A Philosophical Perspective Analysis of Researches in Positivism and Interpretivism Paradigms

Mohammad Rezapour¹

¹Ph.D, Assistant Professor; Faculty member of Ministry of Science, Research and Technology; Islamic Republic of Iran, Tehran, IRAN. m.rezapour@modares.ac.ir

Abstract

Background and Objectives: Given that developing the useful paradigm makes novel and philosophical specifications for administrators of various fields of healthcare dealing with humans. Despite positivistic research and quantitative methodology have much to offer in health research, many questions in healthcare management (HM) cannot be answered by these approaches; such weaknesses of utilizing only a "functionalist paradigm" in HM researchers, tend us to examine a variety of research approaches which may find useful to meet the needs of understanding their environment and purposed as aim of this paper. Methods: Thirty HM articles analyzed using a meta-analysis method based on a philosophical perspective from inform research design field. Findings: We seek not to make an argument about which methodological paradigm is best, rather we present the reader with a paradigm view of each. Despite dominant of functionalist paradigm in many HM researches, we found necessary new HM approaches based on interpretive paradigm. Helpful instances of these approaches in term of HM are explored in descriptive data mining and Health Technology Assessment. Conclusions: This study indicated that in some articles of HM the "Functionalist" paradigm, whereas new challenges are raised for many shift paradigm as a significant requirement. Although this is not a general conclusion about the field of HM researchers, but this is conclusive that HM researchers consider combining approaches rather than just rely on traditional methods. Realizing both objective and subjective knowledge in HM required discussion of the research paradigms, which achieved more by "functionalism" and partly by "interpretive" paradigms.

Keywords: Paradigm, Epistemology, Ontology, Methodology, Health Technology Assessment (HTA), Social Capital.

1 Introduction

Philosophy can be defined as the questioning of basic fundamental concepts and the need to embrace a meaningful understanding of a particular field; the discipline of philosophy



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can be used to allow research to be viewed in a certain way, by using particular accepted approaches [1] Another study suggests needing of natural science in phenomenological philosophy [2]. To accommodate these radically non-classical phenomena, a new philosophical foundation is called for: phenomenology; "Phenomenological philosophy" is brought into focus for use in theoretical physics via qualitative work with topology and hyper complex numbers.

While trial designs and other positivistic research methods have much to offer in health research, their promotion – which are indicators of "functionalist" paradigm – can be misplaced. Many questions about health care are not amenable to randomized controlled trials: For example, a randomized trial could not research the question of the number of people who die every year as a result of waiting too long with severe chest pain before calling an ambulance for ethical and practical reasons; A randomized controlled trial design cannot answer the question of why – it cannot explore what is going on in a person's life and relationships that may have influenced them to delay seeking help. Herein lies one of the weaknesses of utilizing a positivist, quantitative methodology [3].

Tavakol and Zeinaloo have compared philosophical contrast between two different inquiries approaches, with the aim of creating structure for an effective medical inquiry paradigm [4]. They surveyed these facts that while a quantitative (positivistic) inquiry can measure the incidence, the prevalence and the odds ratio, it cannot answer "why," for example "despite improving medical technology, why asthma is getting worse?" Qualitative (naturalistic) studies are concerned with answering questions such as "What is X, how does X vary in different circumstances?" Therefore, qualitative research can complement quantitative research by exploring areas not amenable to quantitative research on its own. Thereupon, both of them can enhance the validation of research: Quantitative research can help to answer the 'how many, how often' questions but qualitative research can help to illuminate 'why' questions.

The study of Ryan and Farrelly was tried to describe patients' experiences of living with advanced heart failure and has found that there may be an illogical but enduring ethos of 'cure' pervading health care worker's attitudes to this disease [5] Lavoie describes the dimension of "interpretive" researches as "free from the objectivist bias" and correspondingly qualitative/interpretive aspects of research in favor of the quantitative/predictive aspects [6]. This study claims that "objectivism" prevents researchers from understanding the real world or from improving upon their theoretical and empirical knowledge. But on the other hand, "interpretive" paradigm alters style of scientific discourse from neoclassical works, because it comes more and more to reflect an interesting rivalry among divergent perspectives, each begging for clear interpretation from the others, rather than a monolithic system of objectively "tested" quantitative relationships which neither asks for nor seems to require any interpretation.

"Interpretive research" is used here to broadly describe social inquiry that derives knowledge claims from the interpretation of lived experiences of individuals or groups; As such it is a subset of qualitative research that assumes that social reality is locally



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and specifically constructed [7].

1.1 The idea of "Health and Trust"

The idea of "social capital" is made such an enduring impact on the contemporary academic research and policy agenda largely because of the attention it has focused on the role and strength of civic associations [8]; The study of Szreter and Woolcock is attempted to outline the policy implications which such a revised theory of social capital would have for the public health field. Also they would argue that taking seriously the concept of linking social capital problematizes in particular the quality of relationships whenever and wherever resources might flow across perceived power gradients. They believe that improving human health requires both the entitlement to appropriate 'material' needs and the capability to benefit from it, which is so often mediated through social relationships.

The report of World Health Organization (WHO) surveyed increasing efforts in recent years to documents what appear to be a rather close link between social capital and health, and based on data from the 21 countries, which covered by the European Social Survey (ESS), confirms this close relationship [9]; in this way, social capital is measured for each of these countries as a weighted mean of individuals' self-reported rate of trust (Fig. 1); The question's exact wording is: "Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people?" The positive relationship is evident and the correlation rather strong (0.51).

1.2 Decision-making by "Health technology assessment"

Health technology assessment (HTA) studies explore an interpretive paradigm in HM researches. HTA is 'the multidisciplinary field of policy analysis that studies medical, social, ethical and economic implications of development, diffusion and the use of health technology' [10].

In policymaking respect of HTA, the metaphor of a bridge is often presented to explain the pragmatic and translational features of HTA: it is the bridge between the community of scientists who produce valid evidence of the impact of technology and policymakers who make decisions that govern healthcare systems and organizations about related topics [11]. Therefore, from the 'policymaker' perspective, HTA is a vital support for making rational and credible decisions and requires that the inputs fit with the general framework according to which decisions are made (e.g. timing and underlying values). Also from the scientific community perspective, the bridge is a strong call for focusing evaluation research on salient issues that can be governed by decision makers; 'building the bridge' requires scientists to serve the needs of policymakers with good science.

It is fundamental to provide a definition of technology to understand the meaning and scope of HTA. While in the past the term has been often limited to 'hard' medical



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Figure 1: Health and trust in 21 European countries; Source: [9] Note: AT = Austria; BE = Belgium; CH = Switzerland; CZ = the Czech Republic; DE = Germany; DK = Denmark; ES = Spain; FI = Finland; FR = France; GB = the United Kingdom; GR = Greece; HU = Hungary; IE = Ireland; IT = Italy; LU = Luxembourg; NL = the Netherlands; NO = Norway; PL = Poland; PT = Portugal; SE = Sweden; SI = Slovenia.

technologies, such as CT scanners or robots, with time, HTA has increasingly made reference to health technologies as 'applied knowledge' used in the healthcare sector or to improve health [12]. While evidence-based medicine (EBM) tries to integrate individual clinical expertise with the best available external clinical evidence from systematic research, HTA incorporates the aims of EBM and makes reference to systematic research with broader goals: to offer guidance to decision making at all levels (including health policies at a macro level) and to assess interventions from a larger societal perspective to include economic, social, ethical, and organizational impacts.

A major feature of HTA is its multidisciplinary content. Policymaking requires an overall assessment of the main aspects that may be impacted by technologies. While efficacy measurements require medical and clinical epidemiologic expertise, the evaluation of other dimensions requires a different type of expertise. For example, for implantable medical devices, engineering and information technology (IT) expertise may be important to make an overall safety assessment. Moreover, genetic technologies and other interventions may raise ethical concerns and thus may require a specific assessment according to ethical standards. In addition, technologies may have an impact on models



Table 1: Dimensions of Philosophical Paradigms and their Dominant [18]

		The sociology of Radical change	
	Radical humanism	Radical structuralism	
Subjective	Interpretive Sociology	Functionalist Sociology Positioning Design/Planning BCG	Objective

The sociology of regular change

of care (e.g. they may favour home care) or may influence personal behaviors (e.g. contraceptive devices) and thus need to be investigated from sociological perspectives [11]. The work is based on the idea that HTA organizations have a responsibility to produce assessments that are as useful as possible to their users, ultimately benefiting public health and well-being.

Ethical analysis both specifies this responsibility to the HTA organization and functions as a tool to help fulfil it. HTA is never value-free, so making values explicit is the key to increasing the international transferability and policy relevance of HTA [13]. Finally, ethical analysis within HTA can provide insight into these issues, and assist decision-makers in interpreting information in a policy-relevant way [14].

In I.R Iran, the book of HTA is online available placed by Ministry of Health and Medical Education of IR. [15].

2 Methods

Thirty articles of Healthcare Management Researches analysed using a meta-analysis method based on a philosophical perspective from inform research design field. Selecting articles is a randomly and therefore, the findings of this research cannot be necessarily generalized to the whole healthcare management field.

From a sociological viewpoint, Burrell and Morgan created the framework for four sociological paradigms which are now widely used to convey a standpoint on a particular issue [16]. Those four paradigms were functionalist, interpretive, radical humanist and radical structuralist.

In many fields of management research, the dominant paradigm of scholars is "Functionalist"; for instance, in Information Systems (IS) only 3.8% of all IS research was "interpretive" [17] or in strategic management [18], as is illustrated in table 1.



Metaphysical Paradigm	Ontology	Epistemology		
Functionalist	Objectivist: direct observation o	Empirical inquiry,		
Functionalist	f concrete reality	scientific method, inductive logic		
Intorprotivo	Subjectivist: social reality	Based on systemic models		
interpretive	intersubjectively constructed	Based on systemic models		
Dadical humanist	Relativist: social reality	Dielectic inquiry		
Kauicai numamsi	Deconstructed	Dialectic inquiry		
Radical structuralist	Post-relativist, change ontology	Post-relativist, change ontology		

Table 2: Ontological and Epistemological Underpinnings of Sociological Paradigm, [19]

Epistemology in this context refers to the nature of knowledge or how we come to know certain things about the world. In the context of health care, an understanding is necessary of how certain research methods and certain approaches to data collection have emerged from vastly different traditions, and, importantly, how they produce different understandings of the social world [3]. Each of above sociological paradigms in terms of their ontological and epistemological underpinnings that are summarized by as table 2: [19].

3 Results

In some studies, about subjective properties, there are observed from perspective sociological that "fundamental change" and in a subjective environment is its main challenge; Thus we find that its paradigm is "interpretive" [2].

Broom and Willis abound a research on HM from newspaper and television documentaries to web sources and academic journals [3]; this study examines broad traditions in health research, from positivism to interpretivism, exploring the implications of these traditions and the various methodological approaches derived from them for health research. Finally, this research aims to provide an "interpretivism" overview of what might be broadly call research paradigms on health.

The "interpretive paradigm" is evident in anti-positivist literature of the Lavoie research [6]. Walther et. al have focused on theoretical framework of research quality and claimed that "interpretive" paradigm helps to inform the development of this framework [7]. The study of Szreter and Woolcock emphasizes the role of community on the agents and moreover, considers society as a fully integrated structural of elements [8]; These assumptions reflect the characteristics of the "objective attitude" and "Sociology regulation". So this study is in the "functionalist" paradigm.

Other functionalist paradigms illustrate [50, 21], which have used positive epistemology and nomothetic methodology using predictive knowledge mining.

Science that the study of Tavakol and Zeinaloo attends on "structural relationship in a realistic society world," so uses "interpretive" paradigm [4]; also this is occurred in the

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study of Ryan and Farrelly, [5] because that they tried to describe patients' experiences of living, so the important care of this study is opinion of people who are directly involved with the issue, therefore it has an "anti-positivism epistemology"; moreover, their methodology was qualitative and open unstructured interviews were audio-taped.

HTA needs to be understood in the context of evidence-based health delivery and policy, which calls for decision making in the healthcare sector and beyond to be based on a systematic analysis of scientific evidence of the effects of interventions [11].

We found dominant interpretive paradigm in HTA studies, which use problemfocused scientific evidence to make policy and organizational decisions. Saarni et. al say modern health technology (and HTA as part of it) can be seen as an "imperialistic" approach towards other health-care ideologies, emphasizing as it does rational, mechanical, non-intuitive and non-emotional ways of thinking [13]. Further they believe, integrating ethics and HTA does not necessarily have to enforce this way of thinking.

Finally, other examples of "interpretive paradigm" can be found at these HM researches: Aqil, et. al argue that based on documented weaknesses of routine health information systems (RHIS), they have developed the Performance of Routine Information System Management (PRISM) framework, which offers a paradigm shift by putting emphasis on RHIS performance and incorporating the organizational, technical and behavioural determinants of performance [22].

In another study about expansion of primary health care (PHC), a family medicine (FM) program has been implemented, a model of social insurance, aiming to identify facilitators of and barriers to implementation of FM in IR Iran [23].

The importance of people who have been asked in the survey by WHO indicates it has an "anti-positivism epistemology" [9]; Also according to ideographic methodology and voluntarism approach in human nature of, it is classified in the "interpretive" paradigm.

Warelow has considered the changing philosophical and theoretical construction of nursing which has moved from an initial focus on positivism and science, and undergone a paradigmatic shift so that it is now being interpreted by some nursing theorists in alternative ways [24]. Wilson, et al used a "critical interpretive synthesis" (CIS) approach, to develop a theoretical framework based on insights drawn from a range of relevant sources [25].

4 Discussion

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Expanding philosophical viewpoint to four articles in 2011-2014 of common authors, which have used "Data Mining" (DM) techniques in healthcare (specially using surgery data), we found: (i) We see in part of articles -[26]–[27] and [47]–[51]- that the dominant paradigm is "interpretive," due to the use of DM's descriptive approaches or subjective models in supply chain management (SCM) on HM; an interpretive structural modeling approach in SCM subject can be found [28]. (ii) On the other hand, using objective models such as DM 's predictive approaches -[29]–[42]- indicates a dominant of "Functionalist" in these HM researches.

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We seek not to make an argument about which methodological paradigm is best, but rather to provide the reader with a critical understanding of how the methodologies presented in the following chapters have emerged from, and contribute to, the reproduction of particular understandings of the social and natural world [3]. According this view, reflected in table 3) (appendix), we present the reader any studied article with a paradigm view of each Philosophical Perspective which explores dominant paradigm rather than another in examined studies.

5 Conclusions

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This study indicated that in some articles of healthcare management (HM) – such as that we studied – the "Functionalist" paradigm, whereas new challenges are raised for many shift paradigm as a significant requirement. Although this is not a general conclusion about the field of HM researchers, but this is conclusive that HM researchers consider combining approaches rather than just rely on traditional methods. Realizing both objective and subjective knowledge in HM required discussion of the research paradigms, which achieved more by "functionalism" and partly by "interpretive" paradigms. Needing for subjective concepts of HM has been extended interpretivism researches in recent years.

Abbreviations

(CIS): Critical Interpretive Synthesis; (DM): Data Mining; (EBM): evidence-based medicine; (ESS): European Social Survey; (FM): Family Medicine; (PHC): primary health care, (HM): Healthcare Management; (HTA): Health Technology Assessment; (IT): Information Technology; (IS): Information Systems; (PRISM): Routine Information System Management; (RHIS): routine health information systems; (SCM): supply chain management; (WHO): World Health Organization.

References

- [1] Burke M E. Making choices: research paradigms and information management: Practical applications of philosophy in IM research. Library review; 2007, 56(6): 476-484.
- [2] Rosen S. M., Why natural science needs phenomenological philosophy, Progress in Biophysics and Molecular Biology, (In Press); 2015.
- [3] Broom A. and Willis E. Competing paradigms and health research. Researching health: qualitative, quantitative and mixed methods; 2007, chapter 2: 16-30.
- [4] [4] Tavakol M. and Zeinaloo A A. Medical research paradigms: positivistic inquiry paradigm versus naturalistic inquiry paradigm. J Med Educ; 2004, 5(2): 75-90.
- [5] Ryan M. and Farrelly M. Living with an unfixable heart: a qualitative study exploring the experience of living with advanced heart failure. European Journal of Cardiovascular Nursing; 2009, 8(3): 223-231.



- [6] Lavoie D. "The interpretive dimension of economics: Science, hermeneutics, and praxeology." The Review of Austrian Economics; 2011, 24(2): 91-128.
- [7] Walther J, et al. "Quality in interpretive engineering education research: Reflections on an example study," Journal of Engineering Education; 2013, 102(4): 626-659.
- [8] Szreter S, and Woolcock M. Health by association? Social capital, social theory, and the political economy of public health. International Journal of Epidemiology; 2004, 33(4): 650-667.
- [9] Rocco L, and Suhrcke M. Is Social Capital Good for Health?: A European Perspective. Copenhagen: WHO Regional Office for Europe, 2012.
- [10] HTA, (2009). International Network of Agencies for Health Technology Assessment. HTA Resources.
- [11] Fattore G., et al. (2011). Health technology assessment: what is it? Current status and perspectives in the field of electrophysiology. Europace; 13(2): ii49-ii53.
- [12] Banta D. (2003) The development of health technology assessment. Health Policy; 63: 121-32.
- [13] [13] Saarni, S I., et al. (2008). Ethical analysis to improve decision-making on health technologies. World Health Organization; 86(8): 617-623.
- [14] Autti-Ramo I, Makela M. (2007). Screening for fetal abnormalities: from a health technology assessment report to a national statute. Int J Technol Assess Health Care; 23: 436-42.
- [15] Olyaeemanesh A. (2013). Health Technology Assessment in Islamic Republic of Iran, Health technology assessment in IR of Iran; is available at: http://ihta.behdasht.gov.ir/ uploads/HTA_book_English_.pdf.
- [16] Burrell, G. and Morgan, G. (1979). Sociological Paradigms and Organisational Analysis, Gower, London.
- [17] Chappell, T. W. (2013). An information systems quandary: Why is there a dearth of interpretive research in a positivist dominated discipline?. PhD Thesis, Diss. CAPELLA UNIVERSITY.
- [18] Rostami M. (2011). How do we think in strategic management?, ICSM05.
- [19] Korhonen, J., and Hiekkanen K. (2013). Doing IT Better: An Organization Design Perspective. Proceedings For the 9th European Conference on Management Leadership and Governance: ECMLG 2013. Academic Conferences Limited.
- [20] Méry, B., et al. Hypofractionated radiation therapy for treatment of bladder carcinoma in patients aged 90 years and more: A new paradigm to be explored?. International urology and nephrology; 2015, 47:1129–1134.
- [21] Carson, M B., and Lu H. Network-based prediction and knowledge mining of disease genes. BMC Medical Genomics; 2015, 8(2): S9.
- [22] Aqil, A. et al. (2009). PRISM framework: a paradigm shift for designing, strengthening and evaluating routine health information systems. Health Policy and Planning; 24(3): 217-228.
- [23] Takian, A. et al. (2011). Expediency and coincidence in re-engineering a health system: an interpretive approach to formation of family medicine in Iran. Health policy and planning; 26(2): 163-173.
- [24] Warelow, P J. (2013). Changing philosophies: a paradigmatic nursing shift from Nightingale. AUSTRALIAN JOURNAL OF ADVANCED NURSING; 31(1): 36-45.
- [25] Wilson M G., et al. (2014). Processes, contexts, and rationale for disinvestment: a protocol for a critical interpretive synthesis. Systematic Reviews; 3(143).



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- [26] Sepehri, M. M., Khavaninzadeh, M., Rezapour, M., & Teimourpour, B. (2011). A data mining approach to fistula surgery failure analysis in hemodialysis patients. 18th Iranian Conference of Biomedical Engineering (ICBME), 2011 (pp. 15-20). IEEE. is available at: ieeexplore.ieee.org/xpl/freeabs_all.jsp?arnumber=6168546.
- [27] [27] Kazemzadeh B R., et al. "Design and analysis of a health care supply chain management." Advanced Materials Research; 2012. 433(440): 2128-2134.
- [28] Govindan, K., et al. "Lean, green and resilient practices influence on supply chain performance: interpretive structural modeling approach," International Journal of Environmental Science and Technology; 2015, 12(1): 15-34.
- [29] Khavanin Zadeh, Morteza, Mohammad Rezapour, and Mohammad Mehdi Sepehri. "Data mining performance in identifying the Risk Factors of early arteriovenous fistula failure in Hemodialysis Patients," International journal of hospital research 2, no. 1 (2013): 49-54. Available at: http://ijhr.iums.ac.ir/index.php/ijhr/article/view/52/116.
- [30] Rezapour, Mohammad, Morteza Khavanin Zadeh, and Mohammad Mehdi Sepehri. "Implementation of predictive data mining techniques for identifying risk factors of early AVF failure in hemodialysis patients," Computational and Mathematical Methods in Medicine 2013 (2013). URL: http://dx.doi.org/10.1155/2013/830745
- [31] Rezapour, M., Sepehri, M. M., & Rezapour, H. (2014). A data mining approach to determine better methods for learners' assessment in e-learning courses. Management Research in Iran, 17(4), 139-160.
- [32] Rezapour M, Khavanin Zadeh M., "Association between non-matured arterio-venus fistula and blood pressure in hemodialysis patients," Medical journal of the Islamic Republic of Iran 28 (2014): 144. Available at: http://mjiri.iums.ac.ir/browse.php?a_id=2569& sid=1&slc_lang=en.
- [33] Khavanin Zadeh, M., Rezapour, M., Khavanin Zadeh, E., Balin Parast, M., & Rezapour, H. (2015). The Relationship between Risk Factors of Hemodialysis Patients and Arterio Venus Fistula Maturation at Hasheminezhad Hospital. Iranian Journal of Surgery, 22(4), 54-64.
- [34] Rezapour, M., Taran, S., Parast, M. B., & Zadeh, M. K. (2016). The impact of vascular diameter ratio on hemodialysis maturation time: Evidence from data mining approaches and thermodynamics law. Medical journal of the Islamic Republic of Iran, 30, 359.
- [35] Rezapour, M., Zadeh Khavanin, and M. Balinparast. "The Role of the Vascular Diameter Ratio in the Arteriovenous Fistula Maturation Time," The Journal of Vascular Access 14, no. 1.
- [36] Rezapour M., Sepehri M.M, Khavanin Zadeh M., Alborzi M. (2017). Data Mining Application for Detect Impacts of Infection and Hypertension on Vascular Surgery Complications, 2th International Conference on Knowledge-Based Research in Computer Engineering & Information Technology.
- [37] Rezapour, M., Payani, E., Taran, M., Rajabzadeh Ghatari, A., & Khavanin Zadeh, M. (2017). "Roles of triglyceride and phosphate in atherosclerosis of diabetic hemodialysis patients". Medical Journal of the Islamic Republic of Iran (MJIRI), 31(1), 465-471.
- [38] Rezapour, M., Sepehri, M. M., Khavanin Zadeh, M., & Alborzi, M. (2018). A new method to determine anastomosis angle configuration for arteriovenous fistula maturation. Medical Journal of the Islamic Republic of Iran (MJIRI), 32(1), 365-370.



- [39] Rezapour, M., Zadeh, M. K., Sepehri, M. M., & Alborzi, M. (2018). Less primary fistula failure in hypertensive patients. Journal of human hypertension, 32(4), 311. Is available at URL: https://www.nature.com/articles/s41371-018-0052-3.
- [40] Rezapour, M. (2018). Forecasting Surgical Outcomes Using a Fuzzy-Based Decision System. International Journal of Hospital Research, 7(1), 1-11., http://ijhr.iums.ac.ir/ article_87050.html.
- [41] Sepehri, M. M. & Rezapour, M. (2019). Medical Data Mining: Efficient Knowledge Discovery from Health Data. Volume 1, Fater Negar, Hospital Management Research Center, Iran University of Medical Sciences.
- [42] Rezapour, Mohammad. "Predicting Stroke in Hemodialysis Patients Using Data Mining," Digital Transformation 1, no. 1 (2021): 45-57.
- [43] Khameneh, M., et al. Using Data Mining for Identify Patients at High Risk to Hepatocellular Carcinoma in the Cirrhosis Liver: Preliminary Report. Govaresh; 2014, 19(4): 265-274.
- [44] Gilson, L., and Raphaely N. The terrain of health policy analysis in low and middle income countries: a review of published literature 1994–2007. Health policy and planning; 2008, 23(5): 294-307.
- [45] Brand, V. Empirical business ethics research and paradigm analysis. Journal of Business Ethics; 2009, 86(4): 429-449.
- [46] Smith, S L. Naïve expertise: spacious alternative to the standard account of method. Philosophy of Management;2010, 9(3): 95-133.
- [47] Rezapour, M., and Nakhostin Ansari, N. "Incidence of Stroke in Hemodialysis Patients with Central Venous Catheter: A Systematic Review," Journal of Vessels and Circulation 2, no. 1 (2021): 27-27.
- [48] Rezapour, M., Nakhostin Ansari, N. Khavanin Zadeh, M. and Asadi, R. "Risk of Stroke in Hypertensive Diabetic Chronic Kidney Disease Patients after Central Venous Catheter placement," Razi Journal of Medical Sciences 27, no. 8 (2020).
- [49] Rezapour, M., Shadpour, P. Karimi, A. Mousavi Jahromi, Y. and Khavanin Zadeh, M. "Inverse effects of anemia and diabetes mellitus on non-cuffed central venous catheters longevity," Iran J Vasc Surg Endovasc Ther http://ijvset.gums.ac.ir, 1, no. 1 (2021).
- [50] Rezapour, M, Asadi, R. and Marghoob, B. "Central Venous Catheter placement, Diabetes Mellitus and Hypertension Are Associated with Risk of Cerebrovascular Accident in Hemodialysis patients". International Journal of Hospital Research 10, no. 3 (2021).
- [51] Rezapour, M. and Ansari, N.N., 2021. Designing and Producing a Telerehabilitation Mobile Application and a Web-Based Smart Dashboard for Online Monitoring of Patients at Risk of Stroke During COVID-19 Pandemic and Post-Pandemic Era. International Journal of Basic Science in Medicine, 6(4), pp.127-131.



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Table 3: Identifed Analyzed HM Researches from the "Philosophical Specifications" Perspective.

Article Properties				nature of the social sciences				Sociological approach		
ID	Year	Author(s)	Jour / Conf / Thesis / Book	Indexer	Ontology	Epistemolo gy	Human Nature	Methodolo gy	Regulation / Fundamental change	Dominant <u>Paradigm</u>
1	2015	Rosen S. M.	Progress in Biophysics and Molecular Biology	Elsevier	Nominalism	Anti- Positivism	Voluntarism	Ideographic	Regulation	Interpretive
2	2007	Broom A. & Willis E.	Researching health: qualitative, quantitative and mixed methods	G- Scholar	Nominalism	Anti- Positivism	Voluntarism	Ideographic	Regulation	Interpretive
3	2011	Lavoie D.	The Review of Austrian Economics	Springer	Nominalism	Anti- Positivism	Voluntarism	Ideographic	Regulation	Interpretive
4	2013	Walther, J. et al,	Jour. Engineering Education	ProQuest	Nominalism	Anti- Positivism	Voluntarism	Ideographic	Regulation	Interpretive
5	2004	Szreter and Woolcock	International Journal of Epidemiology	Oxford	Realism	Positivism	Determinism	Nomothetic	Regulation	Functionalist
6	2012	Rocco and Suhrcke	Guideline Report	WHO	Nominalism	Anti- Positivism	Voluntarism	Ideographic	Regulation	Interpretive
7	2013	Chappell T W.	Ph.D. Thesis	ProQuest	Realism	Positivism	Determinism	Nomothetic	Regulation	Functionalist
8	2004	Tavakol M. & Zeinaloo A A.	J Med Educ	G- Scholar	Nominalism	Anti- Positivism	Voluntarism	Ideographic	Regulation	Interpretive
9	2009	Ryan M. & Farrelly M.	European Journal of Cardiovascula r Nursing	PubMed	Nominalism	Anti- Positivism	Voluntarism	Ideographic	Regulation	Interpretive
10	2011	Sepehri M. M., et al.	ICBME Conf.	IEEE	Nominalism	Anti- Positivism	Voluntarism	Ideographic	Regulation	Interpretive
11	2012	Kazemzadeh B R., et al	Adv MATERIALS RESEARCH	Scientifie c	Nominalism	Anti- Positivism	Voluntarism	Ideographic	Regulation	Interpretive
12	2012	Khavanin Zadeh M., et al.	IJHR	ISC	Realism	Positivism	Determinism	Nomothetic	Regulation	Functionalist
13	2013	Rezapour M., et al.	СМММ	ISI	Realism	Positivism	Determinism	Nomothetic	Regulation	Functionalist
14	2013	Rezapour M., et al.	JRMI	ISC	Realism	Positivism	Determinism	Nomothetic	Regulation	Functionalist
15	2014	Rezapour & Khavanin Zadeh	MJIRI	PubMed	Realism	Positivism	Determinism	Nomothetic	Regulation	Functionalist

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16	2014	Khameneh, M., et al. [43]	Govaresh	G- Scholar	Realism	Positivism	Determinism	Nomothetic	Regulation	Functionalist
17	2011	Fattore G., et al.	Europace	Oxford	Realism	Positivism	Determinism	Nomothetic	Regulation	Functionalist
18	2008	Saarni, S I., et al.	WHO	WHO	Nominalism	Anti- Positivism	Voluntarism	Ideographic	Regulation	Interpretive
19	2013	Olyaeemanes h A., et al.	Book	Ministry of Health and Medical Educatio n	Realism	Positivism	Determinism	Nomothetic	Regulation	Functionalist
20	2014	Wilson M G., et al.	Systematic Reviews	Oxford	Nominalism	Anti- Positivism	Voluntarism	Ideographic	Regulation	Interpretive
21	2015	Govindan K. et al.	International Journal of Environmenta l Science and Technology	Springer	Nominalism	Anti- Positivism	Voluntarism	Ideographic	Regulation	Interpretive
22	2013	Korhonen & Hiekkanen	European Conference on Management	ProQuest	Nominalism	Anti- Positivism	Voluntarism	Ideographic	Regulation	Interpretive
23	2015	Méry, B. et al.	International urology and nephrology	Springer	Realism	Positivism	Determinism	Nomothetic	Regulation	Functionalist
24	2015	Carson & Lu	BMC Medical Genomics	PubMed	Realism	Positivism	Determinism	Nomothetic	Regulation	Functionalist
25	2009	Aqil A. et al.	Health Policy and Planning	Oxford	Nominalism	Anti- Positivism	Voluntarism	Ideographic	Regulation	Interpretive
26	2011	Takian A. et al.	Health Policy and Planning	Oxford	Nominalism	Anti- Positivism	Voluntarism	Ideographic	Regulation	Interpretive
27	2013	Warelow, P J.	AUSTRALIA N JOURNAL OF ADVANCED NURSING	PubMed	Nominalism	Anti- Positivism	Voluntarism	Ideographic	Regulation	Interpretive
28	2008	(Gilson L. & Raphaely N., 2008) [44]	Health Policy and Planning	Oxford	Realism	Positivism	Determinism	Nomothetic	Regulation	Functionalist
29	2009	(Brand V., 2009) [45]	Journal of Business Ethics	Springer	Realism	Positivism	Determinism	Nomothetic	Regulation	Functionalist
30	2010	(Smith S L., 2010) [46]	Philosophy of Management	Springer	Realism	Positivism	Determinism	Nomothetic	Regulation	Functionalist

Table 3 (Contd.)

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