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Original Research

A Causal Model of the Relationship Between Customer Contact Points and Word of Mouth Through Customer Experience in the Insurance Industry

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Abstract

Customer contact points are known as the building blocks of the customer experience and for designing and enhancing the customer experience. The purpose of this study is to investigate the causal relationships between customer contact points and word of mouth through customer experience in the insurance industry in 2021. The present study is applied in terms of purpose and descriptive-correlational in terms of implementation method. This survey included Mashhad insurance clients. As the number of customers is unlimited, the sample size 384 was calculated using Morgan table. Samples were selected using the non-probability Convenience sampling method. Confirmatory factor analysis was used to determine the validity of the questionnaires. The reliability of the questionnaires was obtained using Cronbach's alpha coefficient for all research variables above 0.7. Structural equation method was employed using PLS software. The results showed that customer contact points and their dimensions affect customer experience. Customer experience also had a significant effect on word of mouth. Ultimately, the customer experience mediated the impact of customer contact points and their dimensions on word of mouth. Finally, suggestions were presented based on the research findings.

Keywords: Customer contact points, Word of mouth, Customer experience, Structural equation modeling, Insurance industry.

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Introduction

To manage and grow an organization effectively across multiple industries, a purposeful effort must be made toward a customer orientation. Customer relationship management (CRM) combines communication marketing and information technology strategies to build profitable and long-term relationships with customers and other key stakeholders (Dehdashti, 2014). Managers also believe that developing an effective and long-term communication platform with customers is beneficial for increasing market share and competitiveness. By establishing a solid structure known as CRM, organizations can improve their business capacity (Dous, 2005). Despite this, there have been reports of significant project risk throughout the implementation phase, as well as substantial investments made by businesses in customer relationship management. For instance, Gartner's reports indicate a low success rate for implementing this plan. But, the essential applications of customer relationship management in a variety of fields cannot be denied. Due to the necessity of CRM, companies have felt the need to develop an effective mechanism for enhancing the performance of CRM (Hasangholipour et al., 2012). One method for achieving this field's benefits is the use of modern technologies in customer relationship management, which provide numerous opportunities for an organization to achieve its goals. Indeed, technology can help businesses strengthen their customer relationships and gain a competitive edge.

Word of mouth is one factor that affects companies' relationships with customers. In today's competitive environment, when consumer trust in companies and advertising (including television, radio, catalogs, and billboards) is declining, word of mouth advertising may help develop a permanent competitive edge. Numerous studies have demonstrated the important role of word-of-mouth advertising in influencing attitudes toward decision-making and purchasing and mitigating the risk associated with customers' purchasing decisions. Nowadays, positive word-of-mouth advertising is recognized as a highly effective method of increasing product sales. As a result, this method can quickly propel obscure and unknown products to unbridled commercial fame (Dye, 2000). Additionally, many marketers consider positive word-of-mouth advertising one of the earliest forms of marketing communication. It is frequently one of the most effective methods of communication, especially when delivered by someone we know and trust. While many individuals believe that great word-of-mouth advertising regarding products is mainly the result of their good fortune, research indicates that positive word-of-mouth advertising is related to rigorous marketing planning. According to one of the most comprehensive studies conducted in 2006 by the Harris Company in the United States, word-of-mouth and advice from friends, acquaintances, and coworkers have the most significant influence on buyers' behavior when purchasing ready-made cold foods, medications, and supplements. The insurance market in the country has become competitive as a result of the presence of various private companies. As a result, companies' services are quickly copied and used by competitors. As a result, insurance companies have tried to establish competitive advantages in different ways in recent years. Customer experience management is one of these methods. This subject has become one of the most significant challenges for insurance companies, especially private insurance companies, in the current decade. In recent decades, businesses have tried to establish a good relationship with customers as one of their main strategies because a

positive customer experience converts them to loyal customers, encourages them to recommend the company's services to others, and improves customer satisfaction. Customer experience is becoming an increasingly significant component of marketing management these days. Today's managers should better understand the relationship between structures like customer experience, loyalty, and satisfaction, especially in marketing management literature, where many factors affect customer satisfaction and loyalty. An organization's survival depends on its ability to satisfy the desires and needs of its customers, and this underscores the significance of studying customer behavior. In this study, such topics are discussed and analyzed to understand the research question better. Finally, the main research question is whether customer contact points affect word-of-mouth advertising in the insurance industry through customer experience?

Theoretical Foundations

Customer contact points

Typically, customer contacts and interactions with an organization are not static and do not occur at a particular point in time (Norton and Pine, 2013). Each client has several contact points, each representing an interaction with the organization, whether direct or indirect (Kuehnl et al., 2019). The term "point of contact" refers to any interaction between a customer and a brand that consciously and unconsciously creates a brand experience in the customer's mind. Contact points or touchpoints might be entirely within the brand's control or may even fall outside the brand's control (Karimi, 2019). Table I summarizes previous research on contact point definitions.

Table 1. Defining Contact Points in Previous Research

Key Indicator	Year	Researcher	Definition
Direct or indirect contact with the organization	2020	Barry et al.	Direct and indirect contacts of an individual to an organization at different points in time are called "contact points."
Interaction with the organization	2006	Neslin et al.	Any contact between the organization and the customer through which the interaction occurs is called the contact point.
Interaction with the organization	2011	Patricio et al.	Contact points occur when the customer interacts with a service.
Interaction with the organization	2014	Liming and Mason	The customer experience comprises a series of interactions between the company's employees and the customer, referred to as the customer contact point.
Creating feeling and perception	2013	Jatner et al.	Companies design the customer experience at contact points as a collection of stimuli that should ideally elicit emotional or perceptual responses from the customer.
Interaction with staff and stakeholders	2014	Khanna et al.	All of the ways in which a brand interacts with and affects customers, employees, and

Key Indicator	Year	Researcher	Definition
			stakeholders are considered the brand's contact points.
Direct and indirect events	2014	Baxendale et al.	Contact points are events that occur during direct and indirect communication with the brand.
Communication status with the organization	2017	Jane et al.	A contact point is any situation in which a customer comes into contact with a brand or company.
Direct and indirect interaction with the organization	2017	Funk	Contact points encompass all direct and indirect interactions that customers have with an organization via various channels and at multiple points throughout their relationship with the organization.
Interaction	2018	Folstad and Kvale	Typically, the term "contact point" refers to distinct points of interaction or communication with the customer.
Feeling and perception	2018	Kranzbühler et al.	In theory, a contact point or journey can be interpreted as human emotion and perception.
Elements of experiencing perceptual and emotional responses	2019	Varnaly	Throughout the customer journey, contact points contain various experience elements that elicit perceptual and emotional responses from customers.

Source: Karimi (2019)

Terms like service encounters, moments of contact, and moments of truth have been used as synonyms for contact points in previous research. However, the term contact points are often used to refer to customer interactions with each component of a product, service, brand, or organization at various times. In general, the term "contact points" refers to any interaction between a customer and any part of an organization, whether planned or unplanned, direct or indirect (Meyer and Schwager, 2007).

By combining the ideas of researchers in this field and applying customer experience concepts, the contact point may be characterized as follows: An event that occurs through direct and indirect customer interactions with the organization (products, services, employees, systems, brand) and other actors in this field (other customers, competitors, and the government) through various channels and creates a general perception and feeling in the customer, which leads to a response (Karimi, 2019).

User experience

Customer experience is a relatively new concept, both theoretically and practically, that has received considerable attention in recent years, particularly in the last three decades. According to researchers and marketers, this concept refers to a strategic process for developing a holistic customer value, achieving differentiation, and sustaining a

competitive advantage (Jain et al., 2017). According to Klaus and Maclan (2013), "customer experience" refers to the perceptual and emotional evaluations that result from direct and indirect customer interactions with a company. Customers desire not only effective shopping (perception) but also a pleasurable shopping experience (feeling) (Barari et al., 2020). This concept encompasses all customer interactions with a company, including those occurring before, during, and after the purchase or consumption phase (Schallehn et al., 2019). Customer journey approach is frequently regarded as a tool for comprehending the customer experience (Folstad and Kvale, 2018). According to Verhoof et al. (2009), the customer experience is a broad term that encompasses cognitive, emotional, sensational, social, and physical responses to the supplier. Indeed, the customer experience is accompanied by the generation of mental responses as a result of the customer's interaction with the company's various elements. In online retailers, the online shopping experience is affected by the consumers' buying objectives, that is, customer experience encompasses several facets of customer engagement that may create value via interactions with the company, its products, and other customers (Hedayatnazari and Dehdashti, 2018).

According to Richardson (2010), five phases should be addressed while creating a customer map: determining the customer's journey path, identifying contact points, defining contact points, finding actual decision points, and finally, implementing the user guide. At each stage, the client viewpoint, the emotional aspect of the experience, the model's comprehensiveness, its simplicity and comprehensibility, and collecting different types of data as input should be considered (Karimi, 2019).

The customer experience is generally described as the cognitive, sensational, emotional, social, and physical responses of the customer to any direct or indirect encounter with the service provider, brand, or product across various touchpoints during the customer journey. According to Schmidtt et al. (2015), each exchange of services, regardless of their nature or shape, results in the customer experience. Holbrooke and Hirschman were the first to propose the importance of customer experience in marketing, particularly in the field of services (1982). They said that consumers do not behave logically and that evaluating the price of a product or service is just a portion of their research. The rest of the customers' behavior is influenced by their emotions, feelings, and subconscious; consequently, each purchase has an empirical aspect. The customer experience should be incorporated into models of consumer behavior that are mainly focused on logical components. Subsequently, other researchers focused on creating a lasting and appealing experience in the coming years. The mental nature of the experience indicates the personal nature of the customer experience because it is developed based on each person's deduction of events and pertains to customer engagement at several levels of communication, emotional, sensory, cognitive, physical, and mental. Customer experience is an internal multifaceted and individual psychological state for each customer (Gentile et al., 2017). Also, the customer experience is intrinsically emotional and represents the individual's emotional response to stimuli during service delivery (Pullman and Gross, 2014). On the other hand, the customer must travel to the intended place to acquire the product/service. The customer's overall experience is the outcome of various phases of the trip, including search, evaluation, purchase, consumption, and post-purchase activities. This experience is created not just by exposure to variables that the company can control (advertising, pricing, and the

organization's environment) but also through exposure to uncontrollable variables (influences of others, purchasing purpose) (Verhoef et al., 2009). Based on this viewpoint, each component of the customer encounter and engagement with any section of an organization is referred to as contact points, and the customers' experience is the consequence of their interaction with a collection of contact points along the customer journey (Rosen and Waller, 2009).

Word-of-mouth advertising

If not the primary source of information for customers, word-of-mouth is unquestionably one of the most important ones. Today, the concept of word-of-mouth has received considerable attention in marketing texts and consumer psychology. This subject has been highlighted in particular in relation to services and the spread of innovations. The term "word-of-mouth" refers to social behavior that has become a new standard in modern marketing (Meiners, 2010).

The fundamental premise of word-of-mouth advertising is that information about products, services, retailers, and businesses can be passed from customer to customer. This type of advertising is a non-commercial relationship between a sender and a recipient of a product or service (Chan and Ngai, 2011).

Indeed, word-of-mouth advertising is a sort of informal communication between customers in which information about the ownership, usage, or features of a certain commodity or service or its sellers is shared with other consumers. Word-of-mouth marketing is the practice of spreading information about a brand or business without the use of standard advertising methods (Thomas et al., 2011).

Face-to-face communication between a recipient and a messenger regarding services, products, or brands represents word-of-mouth advertising (Ferguson et al., 2010). Additionally, it refers to the interpersonal relationships that exist between consumers concerning their evaluations and personal experiences with a company or a product (Jason et al., 2010). Consumers trust the credibility of their friends, family, and acquaintances' opinions because they are sincere and free of prejudice (Podoshen, 2008).

According to some research, only 14% of people believe what they see, read, or hear in commercials. More intriguingly, 90% of people trust products or services that have been recommended by a family member, friend, or coworker, because they know buying a product has no benefit for their friends. Interestingly, even in the age of computers and the Internet, people prefer to communicate face to face; 80% of word-of-mouth advertising conversations take place in person, while 20% take place online (Hasangholipour, 2015).

Conceptual Research Model

A conceptual model serves as a starting point and foundation for studies and research; it defines the research variables and their relationships. In other words, the conceptual model is a mental map and an analytical tool.
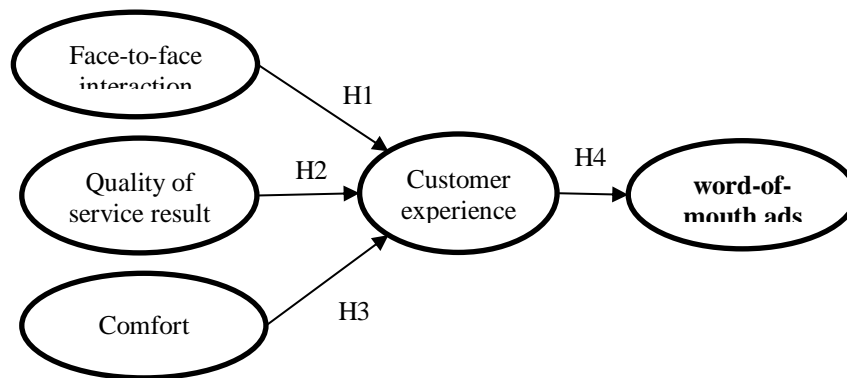
Figure 1. Conceptual research model based on Ribamar Siqueira (2020)

Research Methodology

The present study is a quantitative study that is applied in terms of purpose, and it is survey-descriptive in terms of implementation and nature of research. The study's statistical population consisted of all customers of insurance branches in Mashhad, with an unlimited number of customers, and a statistical sample of 384 participants was calculated using the Morgan table. This study employed the "convenience sampling" method. The Ribamar siqueira (2020) questionnaire, which has 27 questions, was used to measure and collect data. The data were described using SPSS software, and the research hypotheses were tested using the Structural Equation Method (SEM) and Smart-PLS software.

Research Measurement Model

Because the research measurement model is reflective, the research tests are also reflective as defined in the following:

Homogeneity Test

Before performing any test on reflective measurement models, a homogeneity test should be performed to make the one-dimensional questions of a variable (Hair, 2010). Before applying SEM, it is necessary to verify the validity of the research measurement tool through the confirmatory factor analysis (CFA) technique.

Table 2. Confirmatory Factor Analysis (CFA) Results for Questionnaire Items

Subject	Component	Item of questionnaire	Factor load	Statistics	Kurtosis	Skewness
Customer contact point	Face-to-face interaction	P01	0.750	6.776	0.070	-0.686
		P02	0.854	14.530	0.504	-0.816
		P03	0.837	15.184	0.181	-0.687
		P04	0.788	15.731	0.385	-0.704
		P05	0.445	2.238	-0.814	0.043
	Quality of service result	P06	0.840	13.001	0.916	-1.045
		P07	0.885	19.931	0.063	-0.889
		P08	0.864	19.896	-0.039	-0.541

Subject	Component	Item of questionnaire	Factor load	Statistics	Kurtosis	Skewness
		P09	0.802	14.552	-0.243	-0.418
	Comfort	P10	0.859	17.266	0.109	-0.593
		P11	0.896	30.513	-0.346	-0.419
		P12	0.893	24.627	-0.508	-0.297
		P13	0.814	16.509	0.270	-0.849
		P14	0.825	14.723	0.230	-0.568
		P15	0.853	20.623	-0.632	-0.464
Customer experience		P16	0.862	19.904	0.321	-0.679
		P17	0.850	15.325	-0.081	-0.527
		P18	0.915	26.044	0.410	-0.762
		P19	0.900	31.940	-0.157	-0.609
		P20	0.824	14.593	0.031	-0.653
Word-of-mouth ads		P21	0.762	8.067	0.031	-0.653
		P22	0.847	16.079	-0.228	-0.583
		P23	0.871	19.908	0.317	-0.832
		P24	0.935	52.967	-0.009	-0.815
		P25	0.893	26.269	-0.351	-0.577
		P26	0.744	6.092	-0.272	-0.583
		P27	0.858	10.701	-0.531	-0.671

In the fitted factor analysis model, the factor load of all questionnaire items in predicting the relevant items at the confidence level of 0.95 had a significant difference with zero. Also, the amount of factor load is more than 0.5, and their test statistic is more than 1.96, so at this stage, none of these questions was omitted and will not be left out of the process.
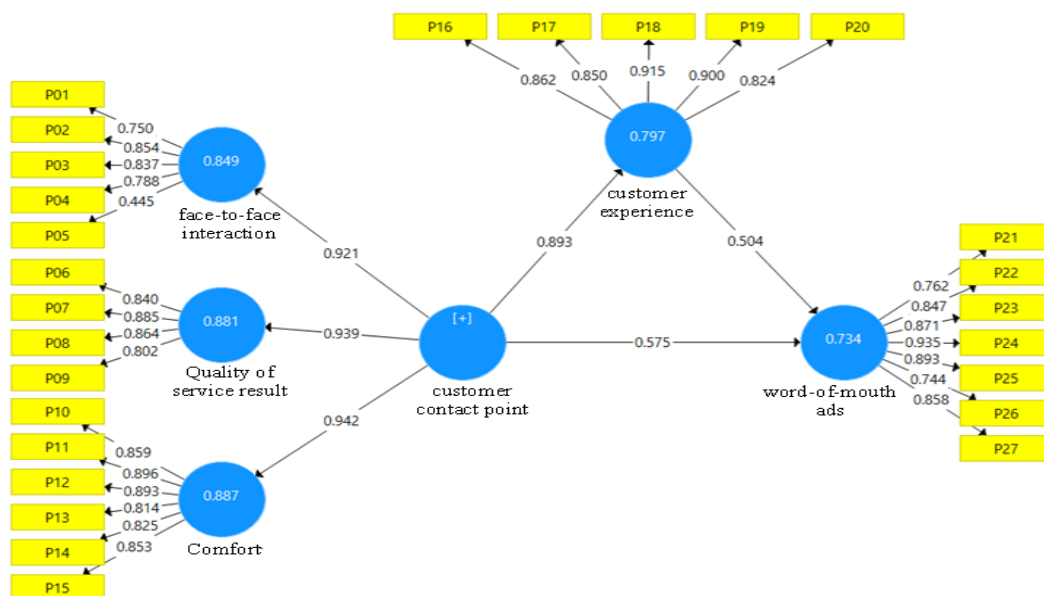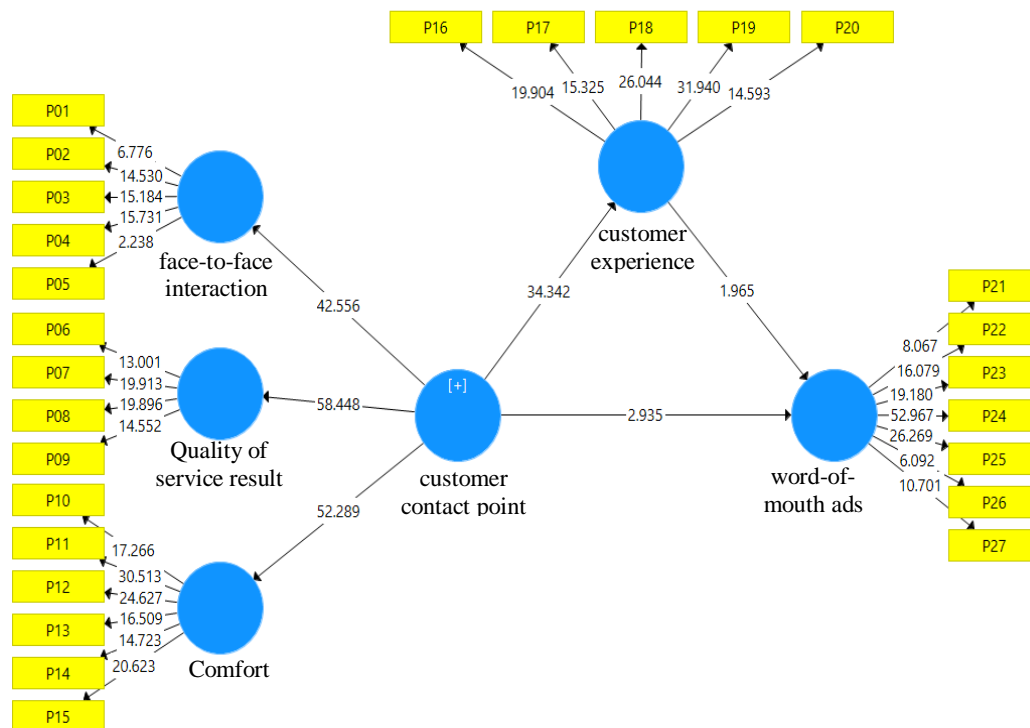
Figure 2. The Factor Loading of the Confirmatory Factor Analysis Model

The Reliability Test of the Measurement Model

Based on measurement indices of the variables, the research model should present similar estimates in other samples from the same community. Thus, in the modified reflective measurement model, various tests are conducted to determine the model's reliability, on which the majority of experts agree. Cronbach's alpha indicates the internal correlation of questions relating to a variable that is not included in the model. According to Fornell and Larcker (1986), Cronbach's alpha should be greater than 0.7. That is, the correlation between the questions about each variable that is not included in the model must be greater than 0.7.

Table 3. Reliability results obtained for the research model

Research variables	Combined reliability	Cronbach's alpha
Comfort	0.943	0.927
Customer experience	0.946	0.933
Face-to-face interaction	0.860	0.792
Customer contact point	0.955	0.948
Quality of service result	0.911	0.869

Based on the results, Cronbach's alpha for all research variables is greater than 0.7, as indicated by the above table. The combined reliability test demonstrates the internal correlation of a variable's questions within the model. The combined reliability coefficient must be greater than 0.7. This test which is more important than others, is shown in the table above, in which all combined reliability coefficients are greater than 0.7.

Model Validity Tests

To properly fit and validate the model, it is necessary to ensure that the convergent and divergent validity aspects, or their differential validity aspects, are both less than 0.9 in terms of correlation between the two of them in pairs. As a result, the model's structural validity is confirmed, as is the absence of overlap between the dimensions of the research variables in the form of differential validity. Consequently, the model's structural validity is confirmed. The validity tests of the model are convergent. It consists of two main tests; That is, the measuring indices of each variable converge with each other.

Average Variance Extracted Test

Table 4. Results of Average Variance Extracted Test

Research variables	Average variance extracted test
Comfort	0.735
User experience	0.717
Face-to-face interaction	0.562
Customer contact point	0.588
Quality of service result	0.719

All AVE coefficients for variables are above 0.5.

Divergent Validity Tests (differential)

Transverse Load Test

The transverse load test demonstrates that each question accurately measures its own variable and is divergent and distinguishable compared to other variables.

Table 5. Transverse Loads

	Comfort	Customer experience	Face-to-face interaction	Customer contact point	Quality of service result
P01	0.679	0.542	0.750	0.718	0.588
P02	0.618	0.566	0.854	0.758	0.708
P03	0.586	0.581	0.827	0.739	0.711
P04	0.617	0.681	0.788	0.755	0.759
P05	0.340	0.384	0.445	0.417	0.408
P06	0.678	0.738	0.757	0.799	0.840
P07	0.666	0.595	0.720	0.798	0.885
P08	0.677	0.710	0.681	0.784	0.864
P09	0.715	0.622	0.752	0.801	0.802
P10	0.859	0.669	0.628	0.619	0.755
P11	0.896	0.738	0.626	0.816	0.686
P12	0.893	0.764	0.641	0.809	0.655

	Comfort	Customer experience	Face-to-face interaction	Customer contact point	Quality of service result
P13	0.814	0.668	0.792	0.852	0.775
P14	0.825	0.670	0.652	0.760	0.595
P15	0.853	0.709	0.604	0.780	0.662
P16	0.742	0.694	0.704	0.782	0.738
P17	0.712	0.635	0.717	0.769	0.732
P18	0.692	0.702	0.756	0.778	0.751
P19	0.734	0.815	0.807	0.810	0.742
P20	0.681	0.696	0.711	0.745	0.702
P21	0.589	0.762	0.592	0.642	0.625
P22	0.763	0.847	0.631	0.766	0.727
P23	0.757	0.871	0.681	0.773	0.706
P24	0.802	0.935	0.758	0.834	0.768
P25	0.731	0.892	0.622	0.734	0.670
P26	0.598	0.744	0.516	0.584	0.498
P27	0.580	0.855	0.557	0.622	0.639

Fornell and Larcker Tests

Henseler (2009) stated, referencing Fornell and Larker's investigations, that in addition to the questions about each variable's relationship to the other, the variables themselves must diverge from one another (that is, lack of alignment or critical correlation). Therefore, in Table 6, the correlation between the latent variables is the square root of AVE instead of the prime numbers on the main diameter. The AVE square root of each variable must be greater than the correlation of that variable with other variables.

Table 6. The Results of Fornell and Larcker Test

	Comfort	Customer experience	Face-to-face interaction	Customer contact point	Quality of service result
Comfort	0.857				
Customer experience	0.821	0.847			
Face-to-face interaction	0.772	0.744	0.850		
Customer contact point	0.942	0.846	0.921	0.967	
Quality of service result	0.807	0.790	0.82	0.739	0.890

Quality Test of the Reflective Measurement Model

Since PLS lacks reliable fit indices, the quality of the model is evaluated instead of the fit in studies. This test examines each variable's questions and accurately assesses its variables. The common index cross-validity test is used to carry out this test.

Common Index Cross-Validity Test

The common index cross-validity test is measured with three numbers: 0.02, 0.15, and 0.35.

Table 7. Common index cross-validity test

	SSO	SSE	Q2 (=1-SSE/SSO)
Comfort	324	132.866	0.59
Customer experience	378	154.765	0.591
Face-to-face interaction	270	174.411	0.354
Customer contact point	810	408.015	0.496
Quality of service result	216	108.852	0.496

The data revealed that the quality of the measurement model is strong for each of the several variables examined.

Structural Model Test (Internal Model)

The structural model is examined after the external measurement model has been examined. In fact, the path analysis, path coefficient, determination coefficient, and model fit index are all used in the second step of Holland's procedure. In path analysis, the relations between variables flow in one direction, and they are considered as different paths. The path diagram, which reveals possible causal links between variables that explains path analysis (Hooman, 2009).

Table 8. The Results of Research Hypotheses Analysis

Direct path	Path Coefficient	Sig.	Test Statistics	Result
Face-to-face interaction → customer experience	0.851	0.000	26.580	Confirmed
Quality of service result→ customer experience	0.844	0.000	19.925	Confirmed
Comfort → customer experience	0.830	0.000	20.282	Confirmed
Customer experience → word-of-mouth ads	0.504	0.000	1.965	Confirmed

Direct path	Sig.	Path coefficient	Test statistics	VAF	Result
Face-to-face interaction→ word-of-mouth ads	0.000	0.750	14.647	------	Confirmed
Face-to-face interaction →customer experience → word-of-mouth ads	0.000	0.577	4.156	0.496	Confirmed
Comfort → word-of-mouth ads (without mediator variable)	0.000	0.824	21.065	------	Confirmed
Comfort →customer experience → word-of-mouth ads	0.000	0.465	2.842	0.434	Confirmed

The Coefficient of Determination

It's worth noting that the value of R^2 is calculated only for the model's dependent (endogenous) structures, and the value of this criterion is zero for exogenous structures. The higher the R2 value for a model's endogenous structures, the better the

model fits. The R2 criterion considers three values of 0.19, 0.33, and 0.67 as criterion values for weak, medium, and strong fits of the structural part of the model.

Table 9. The Results of the Coefficient of Determination Analysis

Research Components	Coefficient of Determination
Word-of-mouth ads	0.723
Customer Experience	0.793

Discussion, Conclusion, and Recommendations

The process by which a person conveys information and feelings to another person or persons via verbal and non-verbal messages is referred to as person-to-person interaction. This ability contributes to developing a warm and intimate relationship with others and helps resolve conflicts. Now, if this interaction between people is related to a product, service, or organization, it has the potential to influence another person to use that product, service, or organization, thereby affecting the customer experience. When people interact with one another in relation to a product or organization, this interaction has the potential to influence the perceptual and emotional evaluations formed as a result of direct and indirect customer interactions with the organization, which is referred to as the customer experience. This finding is consistent with previous research conducted by Shirmohammadi et al. (2015), Yadolahi et al. (2017), Ribamarsquiera et al. (2020), and Kantama (2014). As a result, it is suggested that the involved insurance companies take the customer-to-customer relationship seriously and leverage word-of-mouth as a marketing tool to increase the penetration of their competitive advantage.

Consistent compliance with customer expectations and an understanding of the customer expectations for a particular service define service quality. Due to the intangible nature of services, their length of delivery, the complexity of financial services, and the significant uncertainty associated with establishing high-quality relationships with customers, service quality has a significant impact on customers' perceptions of service. As a result, the quality of customer service can have an effect on the customer experience. This finding is consistent with previous research conducted by Mobarakeh Khalouzadeh (2020), Dehghan et al. (2015), Ribamarsiquera et al. (2020), and Froudi et al. (2018). As a result, it is recommended that the primary service delivery process and employee interactions with customers during service delivery must be consistent and integrated. Employees should understand the significance of their role in developing and promoting brand awareness and enhancing service quality, and they should receive the necessary training in this area. In order to increase the effectiveness of their advertising on customers, service organizations must also provide a clear picture of the quality of their service in their advertising.

Generally, customer comfort is defined as consumers' perception regarding the amount of time and effort required to purchase or use a service. Overall, the comfort and ease of use of services represent the intrinsic value of the time and energy spent by the customer during or after consuming services. A high level of comfort assists customers in making purchase decisions and also achieving tangible evidence of service outcomes by

minimizing time and energy required, which eventually impacts the customer experience with the offered services. This is in line with previous research such as Heshmati et al. (2020), Dehdashti et al. (2015), Ribamarsiquera et al. (2020), and Flip Kalous et al. (2013). Therefore, it is suggested that for improving customer comfort, insurance branches' operating hours be determined in accordance with seasonal changes, as well as consulting customers about operating hours. Additionally, it is recommended that customers be provided with access to welfare facilities.

The customer's emotions determine customer experience. If the customer has a positive experience during their interaction with the business, it has provided a positive customer experience. By providing a positive customer experience, the consumer will recommend the business to their friends and acquaintances, resulting in word-of-mouth advertising for the company. This is in line with the research of Karimi (2020), Shafiei (2020), Heidari (2012), Ribamarsiquera et al. (2020), and Sharma (2016). Therefore, it is recommended to use word-of-mouth marketing and provide valuable information, customer feedback, and views about the insurance company's services, to enhance the customer experience and repurchase possibility.

If one person communicates with another through a channel of communication (verbal or non-verbal) to influence, guide, and control the other person, this interaction and transmission of messages are referred to as interpersonal communication, and when this communication occurs with other people, it is referred to as interpersonal relationships. When clients have a good experience with the business's services, they will speak about it in their interpersonal interactions and share it with other friends and acquaintances, resulting in word-of-mouth promotion for the company. As a result, the appropriate circumstances for word-of-mouth communication should be established to encourage consumers to speak with friends, family, and coworkers about the quality of the company's services and share their experiences with them. This is in line with previous research such as Khodaei Gargari and Abbasi Esfanjani (2020), Mansouri Moayed et al. (2018), Ribamarsiquera et al. (2020), and Almani et al. (2012). Thus, it is suggested that the company increases the level of interactive motivation and interactive activity of customers with the company by establishing mutual, effective, and efficient communication between managers, employees, and customers of the company's services and products. This will lead to word-of-mouth advertising by customers and result in a better experience in customers' minds.

Service quality is the customer's judgment, and it is defined as the gap between what a customer expects from a business and what the customer actually receives. Therefore, based on the customer experience, service quality can be expressed as the degree of understanding between the client's expectations or desires and his comprehension of the actual performance of the service. The quality of service is an important component of the customer experience because it increases customers' motivation to re-use the service and, more importantly, it generates positive publicity for the organization and attracts new customers. In other words, changing the customer experience and understanding the quality of services provided by the company to customers can affect word-of-mouth advertising about the company and customers' recommendations to others. This is in line with the research results of Fereydoni and Kalateh Seifari (2019), Heshmati et al. (2018), Ribamarsiquera et al. (2020), Liu and Lee (2016), Kitabsi et al. (2014). Thus, it is

suggested that after-sales service be improved to improve customer experience and, as a result, brand loyalty and customer and user purchase decisions.

Service comfort is a tool that adds value to the customer experience by minimizing the time and effort required to acquire a service. Customers are not looking for their intended services; instead, they want a service to be available whenever and wherever they need it. Indeed, what is important to the client is using products and services that save them time and improve their welfare. Consequently, the urge to use the services of companies that prioritize customer satisfaction derives from the consumer's desire for a pleasant lifestyle, and ease of use is a fundamental requirement for them. The customers' experience of service comfort affects the customer's overall evaluation of the service, their satisfaction, perceived service value, and ultimately word-of-mouth advertising among customers and enhances word-of-mouth advertising about the company's services, among other people. This is in line with the research results of Rahimi Baghmalek et al. (2020), Farrokhi et al. (2018), Ribamarsiquera et al. (2020), and Greg et al. (2014). As a result, it is recommended that a variety of features and services be considered to facilitate customers' decision-making and provide customers with a better range of selections according to their requirements and benefits. Such tangible and comprehendible benefits for customers can act as a source of competitive advantage for the company.

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Original Research

Narcissistic Leadership and Follower Voice: The Mediating Roles of Surface Acting and Emotional Exhaustion and Moderating Role of Attachment Style

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Abstract

Leadership has become an important topic in industrial-organizational psychology, and a popular concept for adult development. Researchers generally believe that one of the factors that lead to leaders harming followers is narcissistic leadership. Narcissistic leaders generally cause emotional damage to their followers with their actions and behavior and silence them by reacting negatively to criticism. In this regard, the current research, using resource conservation theory (COR), attachment theory and narcissism literature, examines how and in what ways narcissistic leaders suppress followers' voice behavior and when this effect can be reduced. Accordingly, this study develops a moderated mediation model where surface acting and emotional exhaustion mediates the relationship between narcissistic leadership and follower's voice behavior and the two attachment styles of anxious and avoidant moderate the relationship between narcissistic leadership and surface acting. The results largely support the hypotheses of this research based on the data collected from 305 students studying at Iranian public universities. Particularly, narcissistic leadership directly impacts follower's voice via surface acting and emotional exhaustion. Lastly, the narcissistic leadership and follower's voice connections are favorably moderated by avoidance attachment style. Today, organizations need constructive ideas and opinions from their members for individual and group growth. In order to prevent the waste of emotional resources and silencing the voice of employees, organizations should consider a suitable approach for the growth and development of a culture of criticism and questioning, as well as better communication with followers.

Keywords: Narcissistic leadership, Follower voice, Surface acting, Emotional exhaustion, Attachment style.

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Introduction

The main feature of narcissism is holding contrasting self-concepts of grandiosity vulnerability causing their crave for external admiration (Back et al., 2013), impacting others' lives tremendously (Huang, Krasikova & Harms, 2020). Given that, researchers are highly attracted to study narcissism and its association with leadership (De Vries & Miller, 1985; Sosik, et al., 2014; Carnevale, Huang & Harms, 2018). Preoccupied with the self, narcissistic leaders can jeopardize mutual relationships through sharing some common characteristics such as unwillingness to accept criticism, aggressiveness, empathy deficiency and arrogance (Campbell et al., 2011). One of the detrimental effects of narcissistic leaders is reducing employee voice, which can stifle individual creativity (Chen & Hou, 2016), lower innovation (Gambarotto & Cammozzo, 2010) and even productivity (Kim, MacDuffie & Pil, 2010), all of which can mute followers' voice (Yao, Zhang, Liu, Zhang & Luo, 2019; Mousa et al., 2020). Considering the importance of voice behavior as a selective process to talk to keep silent (Morrison, 2011; Avey, Wernsing & Palanski, 2012), prior studies have shown narcissistic leaders decrease employees voice through lowering followers' energy; however, hitherto, no research has investigated "why" and "how" energy is depleted. This study considers surface acting defined as emotional labor changing outward emotional display rather than altering the inner true feelings (Abraham, 1998; Grandey, 2000) as the intervening variable and attachment styles-anxious and avoidant, as the moderators to cast more light on the mechanism through which followers do not voice.

The conservation of resources (COR) theory (Hobfoll, 1989) and narcissism literature were used to suggest a moderated mediation model delineating why and under what conditions narcissistic leaders have a negative impact on followers' voice and how this influence can be moderated. COR theory proposes that individuals are encouraged to conserve their limited resources or to gain new resources to avoid resource loss (Hobfoll, 1989). Unfortunately, narcissistic leaders cause job stress (Yao et al., 2019) through generating demands consuming employees' time, energy, and other resources (Carnevale al., 2018) and yet they expect constant admiration by their followers and reject negative feedback aggressively (Kumar, 2019). In return, we argue that followers resort to surface act as a coping strategy to fake positive emotions and/or suppress negative emotions to avoid losing more of their resources and to maintain their interaction with the leader.

Based upon cognitive dissonance theory (Festinger, 1954), doing surface acting initiates emotional/cognitive dissonance which can cause emotional exhaustion because employees contract stress due to an obligation to show emotions differing from their true feelings (Grandey, 2000; Hochschild, 1983); therefore, their resources are depleted (Grandey, 2003; Brotheridge & Grandey, 2002); consequently, they become less open-minded, less driven and more apathetic (Hagen, 1989). Hence, emotionally exhausted individuals may be less likely to voice thereby conserving the remnants of their already repleted emotional resources (Bolino & Turnley, 2005). Accordingly, surface acting can function as a cause for emotional exhaustion to stop followers' voice.

Additionally, this study considers the boundary conditions under which the adverse effect of narcissistic leadership can be attenuated. In this regard, considering that those

employees with high attachment anxiety tend to be more closely involved in work relationships and processes; nevertheless, this closeness comes at a cost in that they experience more strain when participating in social encounters (Leiter, Day & Price, 2015). On the contrary, people who have high levels of avoidance attachment, trusting other people is tough and do not share their feelings, nor depend on others; therefore, they shun intimacy and emphasize independence (Hazan & Shaver, 1990). Therefore, it is argued with a high (vs. low) avoidance attachment style is less likely to engage in relationships and interactions; therefore, they are less influenced by the destructive behaviors of narcissistic leaders; however, people with high anxiety attachments style are more likely to engage in interactions and relationships, so they incur more costs from narcissistic leaders.

The contributions of this study are threefold. First, this study is among the first elaborating on the emotional mechanism linking narcissistic leadership to emotional exhaustion (Spain, Harms & LeBreton, 2014; Carnevale, Huang & Harms, 2018). Second, using attachment theory as an important volitional variable in interactions (Mikulincer & Shaver, 2003), this study tries to propose attachment styles- anxious and avoidant- as the enhancers or exacerbators of the relationship between narcissistic leadership and employees' voice. Third, this study also expands the leadership and voice literature by examining followers' emotional labor, including surface acting. The theoretical model appears in Figure 1.
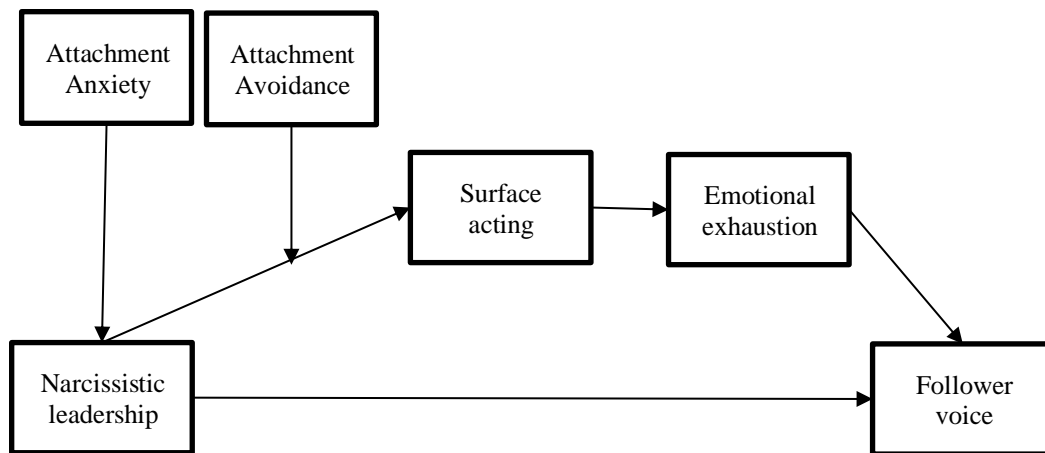
Figure 1. Theoretical model summarizing the predicted relationships between constructs

Leader narcissism and followers' voice

Voice behavior refers to the expression of creative ideas, directions and opinions that encourage other people to accept these constructive suggestions (Ng & Feldman, 2012). The voice is considered as discretionary behavior through which Individuals select whether to initiate in this behavior at any moment in time or not, a choice that is impacted by a range of factors. The occurrence of voice behavior is contingent on diverse factors including the cost-benefit analysis (Detert & Burris, 2007). In other words, employees usually start a calculated and deliberate decision-making process before articulation,

which helps the evaluation of voice behavior consequences (Ashford, Rothbard, Piderit, & Dutton et al., 1998; Morrison & Phelps, 1999).

However, recent studies on employee voice behavior have demonstrated the association between the implementation of the ideas expressed by employees through voice behavior and leadership style. Putting it differently, the follower can assess the cost and benefit of voice behavior based on the leader's style and behavior (Howell et al., 2015). Among leadership styles, narcissistic leaders are more likely to create conditions that would discourage follower voice (Liao et al., 2019; Huang et al., 2016). Huang et al. (2019) examined the action of narcissistic leaders to silence their followers from a COR perspective and figured out that narcissistic leaders as emotional vampires are motivated to maintain their limited psychological and social resources (e.g., a strong ego and perceptions of superiority) thereby, hindering follower voice (Huang et al., 2019). The absence of understanding others' emotional states under the label of apathy is a core quality of narcissism (Hart, Hepper & Sedikides, 2018). In dyadic relationships, narcissistic leadership may dictate demands which deplete cognitive and emotional resources, thereby reducing employee energy and even deterring employees from speaking up (Carnevale et al., 2018). As an indispensable part of their conduct, narcissistic leaders are sensitive to criticism, and they are inclined to adopt knowledge concealing strategies with follower (Glad, 2002) and often react aggressively in response to negative opinions and criticism and, generally, they are not enthusiastic to seek the views of their subordinates (Nevicka et al., 2011) and thus followers who defend themselves in silence, keep their information and opinions in their minds not to lose their self-protection and feel fear (Van Dyne et al.,2003). Finally, the prediction of non-appropriate responses from narcissistic leaders after receiving feedback seals the lips of followers due to the possible resource loss (Huang et al. (2019). Based on the previous research, the following hypothesis is proposed:

H₁: Leader narcissism is negatively related to follower voice.

The mediating roles of surface acting and emotional exhaustion

Drawing on COR theory, we argue that narcissistic leadership is an important stressor depleting the positive emotions of followers and act as emotional vampires (Bernstein, 2012; Carnevale, Huang & Harms, 2018). As a result, they capitalize upon surface acting to stop more resource loss. To elaborate, narcissists need persistent adulation and validation of their superior power to maintain their inflated, but nonetheless tenuous, self-perception (Grijalva& Harms, 2014; Morf & Rhodewalt, 2001); thus, in many cases, they try to satiate their excessive need for dominance over others (Raskin et al., 1991; Raskin & Terry, 1988) through the sheer obedience of others (Bushman & Baumeister 1998). To establish such a climate, narcissistic leaders humiliate followers and deal aggressively with those who offer negative feedback (kumar, 2019) and tend to surround themselves with admiring and flattering followers, all of which can harm followers' health (Brooks, 2016). According to COR theory, individuals are motivated to engage in resource conservation activities (Hobfoll, 1989). To minimize harm, employees are likely to lose considerable cognitive and emotional resources to cope with their narcissistic leader's fragile ego (Raskin & Terry,1988; Wink, 1991).

The consequences of the injuries and cost imposed by narcissists may vary greatly, depending on the degree and the way these injuries are prevented. Some people are able to conceal their emotional strains for themselves behind the facade of their apparently well-adjusted personality; however, are mostly acting against their own feelings (Jørstad, 1996). Research has shown that followers vail their true feelings to enhance their interactions and minimize the harm of narcissistic leadership through surface acting, thereby conveying positive emotions (Lee & Madera,2019). Surface acting independently helps voice to be less costly and safer for people (Grant, 2012). This results in investing a certain amount of emotional effort in their jobs to express organizationally desirable emotions based on organizational policies and emotional norms (Prati, et al, 2009). This climate is likely to obstruct followers' expression of their ideas, opinions, and criticisms and this will drain energy and demotivate productive voice behaviors.

Looking through the perspective of emotional depletion, various factors influence emotional exhaustion such as organizational factors and individual characteristics (Mulki et al., 2006). Organizational factor such as leadership style (Mulki et al., 2006) is an important individual factor boosting stress (Stordeur et al., 2001; Gaines & Jermier,1983; Thompson et al., 2005). In this regard, surface acting that may be initiated by narcissistic leadership acts as an active stressor for followers (Hochschild, 1983). According to cognitive dissonance theory (Festinger, 1954), engagement in surface acting develops emotional/cognitive dissonance that could be an antecedent of emotional exhaustion because employees have an obligation to display emotions that differ from their true feelings (Grandey, 2000; Hochschild, 1983) and also this pretentious behavior causes job burnout, resource depletion, depersonalization, and depression (Brotheridge and Grandey, 2002; Grandey, 2003; Morris and Feldman, 1997), which ultimately boils down to emotional exhaustion (Grandey, 2003).

Emotional exhaustion features lack of energy (Maslach, 1982) and a feeling that one's emotional resources are utterly depleted (Wright & Cropanzano, 1998), thereby less open mindedness, less motivation and more apathy pursues (Hagen, 1989). Given that, emotions have a special effect on expression and voice (Blanton, 1915) and according to Feldman (2012, p. 216) "followers probably use voice to regulate personal and emotional resources through deciding whether to voice or not." The conservation of resources (COR) theory (Hobfoll, 1989) provides an appropriate ground to examine the connection between stress and voice and the motivation to use voice to protect or acquire personally valued resources (Qin et al., 2014).

In some situations, speaking up can cause social and professional risks in addition to costing valuable time and energy; hence, emotionally exhausted employees may be less likely to voice to conserve the remnants of their already diminished emotional resources (Bolino & Turnley, 2005). On the same ground, defensively silent followers withhold information and opinions to protect themselves and escape from probable fear (VanDyneetal.,2003). After the consideration of the above-mentioned points, the following hypothesis is proposed:

H₂: Surface acting and emotional exhaustion mediate the relationship between narcissistic leadership and followers' voice behavior in a way that narcissistic leadership

causes surface acting from the followers' side to feel emotionally exhausted and ultimately voice behavior is impaired.

The moderating role of attachment style

Recent research on attachment theory revolves around the hinge of classifying individuals into two types of avoidance (i.e., uncomfortable with others' desires for closeness and dependency) and anxiety (i.e., desiring a high level of closeness to others, but anxious that others might not want to be close) (Swaminathan, Stilley & Ahluwalia, 2009; Levy et al., 2011; Baldwin & Fehr, 1995). Considering the conspicuous impact of attachment style on relationships and social interactions (liu et al., 2013), this study investigates the effect of two types of anxiety and avoidant attachment on the relationship between leader and follower is investigated. Consistent with the stress-generation hypothesis (Hammen, 1991), attachment insecurity may contribute to the increased likelihood of creating additional stressful life events (Bottonari, Roberts, Kelly, Kashdan & Ciesla, 2007; Hankin, Kassel & Abela, 2005). Moreover, individuals with insecure attachment are prone to have deficits in regulating emotions (Mikulincer, Orbach & Iavnieli, 1998; Shaver & Mikulincer, 2013) and developing and maintaining close interpersonal relationships (Bartholomew, 1990). In contrast, those individuals having high levels of avoidance attachment tend to dismiss the importance of social and interpersonal domains (Mikulincer & Shaver, 2007) and prefer to maintain a safe emotional gap from others when stress occurs (Mikulincer & Florian, 1995). This avoidance of intimacy is judged as a self-protective stance against disappointment and rejection (Lapsley & Edgerton, 2002). Accordingly, we argue that followers with a high level of avoidant attachment avoid engaging in relationships with the narcissistic leader, and as a result, may find themselves less harmed by the stressful behaviors of narcissistic leaders; therefore, followers with high levels of avoidance attachment may be less likely to take on the surface acting.

H₃: Follower's avoidance attachment style moderates the positive relationship between leader narcissism and surface acting in a way that this positive relationship will be stronger (vs. weaker) in the presence of high (vs. low) attachment avoidance.

On the contrary, attachment anxiety is related to intensifying appraisals of distressful situations, in which threats are perceived as extreme and coping resources as insufficient (Mikulincer et al., 2003). Individuals experiencing more anxiety when abandoned tend to possess a negative self-view (Mikulincer & Florian, 1995). They are more hypersensitive to the signs of rejection and they feel a compulsive need to be close to others (Leiter, Day & Price, 2015). As a result, they are more dependent and tend to become enmeshed in relationships (Lapsley & Edgerton, 2002). More exposure to social encounters imposes more strain to those with higher levels of attachment anxiety and this is partly due to their need for dependence (Leiter, Day & Price, 2015). Accordingly, it is argued that individuals with high levels of anxiety attachment are more likely to be harmed when confronted with the traumatic behaviors of narcissistic leaders. Also, people with low anxiety attachment styles are less likely to bear the costs of narcissistic leaders, so anxiety attachment styles may moderate the relationship between narcissistic leadership and surface acting. With the above said, The following hypothesis is proposed:

H₄: Follower's anxiety attachment style moderates the positive relationship between leader narcissism and surface acting in a way that this positive relationship will be stronger (vs. weaker) in the presence of high (vs. low) attachment anxiety.

Method

Participants

Participants consisted of 305 undergraduate and graduate students from public universities. Due to the dispersion of students and unavailability, an online questionnaire was used and sent through social media. About 1061 people saw the questionnaire; however, 350 students completed the questionnaire (response rate of 33%). Out of these 350 participants, finally 305 good data were obtained. The sample demographics of the final participants were as follows: 59.7% were female; they were 23.12 years old on average (SD =4.53); There were about 23 members in each class, and at least five people took part in the survey. Survey forms sent to students include a report of the professor's narcissism, assessment of anxiety and avoidance attachment styles, surface acting, emotional exhaustion, and voice behavior.

Measurements

Narcissistic leadership: Narcissistic leadership was measured with an 8-item scale developed by Resick, Whitman, Weingarden, and Hiller (2009). Students were asked to rate the extent to which each item characterized their professor on a five-point scale ranging from "1=not at all" to "5=to a large extent". Sample items include "Arrogant", "Conceited", and "Show-off" (α=.81).

Surface acting: To measure students' surface acting, the 5-item scale developed by Brotheridge and Lee (2003) was adapted to suit the relationship between the professor and the student. A sample item was "For better communication, I try not to express my true feelings" with a 5-point response scale ranging from 1 (never) to 5 (always) . The Cronbach's alpha of this scale was 0.85.

Emotional exhaustion: Emotional exhaustion was measured with a 5-item scale adapted from Schaufeli et al. (2003). Students answered these questions on a four-point scale ranging from "1= not at all" to "4=to a large extent". Sample items include: "I feel emotionally drained by my studies", "I feel used up at the end of a day at university" and "Studying or attending a class is really a strain for me." (α=.80).

Voice behavior: Voice behaivor was measured with the 6-item voice behavior scale (Van Dyne & LePine, 1998) after some changes to suit research context. Students were asked to rate their agreement with each statement on a five-point scale ranging from "1=Very low" to "5=Very much". A sample item was: "I express my opinions about the class even if my opinion is different and the professor and others disagree with me." (α=.81).

Attachment Styles: Both types of attachment anxiety and attachment avoidance were measured by 10-items developed by Leiter, Price, & Day (2013) with 5 items per dimension. The questions were adapted to suit the academic context. Using a 5-point

Likert type scale (1-not at all like me; 3-somewhat like me; 5-very much like me), professors and students both showed the extent to which items described them (e.g., for attachment anxiety: "I worry that others don't value me as much as I value them"; for attachment avoidance: "At university, I do not need close friendships with others". For students, Cronbach's alphas were α= .72 and α= .81 for attachment anxiety and attachment avoidance, respectively and for professors, Cronbach's alphas were α= .72 (anxiety) and α= .81 (avoidance).

Analysis

PROCESS macro for SPSS developed by Hayes (2013) was used to test the hypotheses via considering two nested models. Initially, bootstrapping procedure (Preacher and Hayes, 2008) was chosen to analyze the mediation model (Model 1). In the second phase, moderated-mediation analysis (Model 2) was performed based on Preacher et al. (2007) bootstrapping procedure to extract the proposed conditional indirect effects proposed in Hypotheses 2 after considering moderators in the conceptual model (Edwards and Lambert 2007). In bootstrapping technique, a sampling distribution pertaining to indirect effect is generated through resampling with replacement and can be utilized to make confidence intervals. The exclusion of zero in the confidence intervals is the indication of significance for the indirect effects (Shrout and Bolger 2002). One of the merits of bootstrapping is the building of non-normal sampling distribution causing more robust statistical analysis through Type 1 error reduction (MacKinnon et al. 2004; Preacher and Hayes 2008).

Table 1. Descriptive statistics, correlations, and reliabilities

Variables	M	SD	1	2	3	4	5	6	7	8	9	10
Age	23.20	4.53										
Gender	1.59	.49	-.45									
Class member	23.03	13.27	-.41**	.03								
Class time	2.40	1.51	-.49	.01	-.06							
Narcissistic leadership	2.44	.12	-.10	-.11*	-.03	.1	.81					
Attachment avoidance	2.36	.80	.05	-.01	-.02	.07	.75	.83				
Attachment anxiety	2.83	.80	-.09	-.04	.08	.05	.21**	-.10	.74			
Surface acting	2.41	.89	-.15**	-.13*	.01	.1	.34**	.15**	.30**	.85		
Emotional exhaustion	2.14	.62	-.16**	-.1	.04	.07	.29**	.09	.26**	.42**	.81	
Follower voice behavior	3.18	.78	.13*	-.05	-.12*	.02	-.12**	-.18**	-.07	-.39**	-.37**	.81

N = 305. Alpha reliabilities are in italics and appear on the diagonal
M: mean, SD: Standard Deviation
**p<0.01
*p<0.05

In the output of PROCESS, the index of moderated mediation as an interval estimate was considered to prove the mediation is accentuated while diverse values of the moderator are considered (Hayes 2014). In this regard, first, unstandardized coefficients are reported as better metrics (Asher 1983; Hayes 2013; James et al. 1982), second, mean centering was utilized to enhance the interpretation direct effects in Model 1 and Model 2. See Table 1 for descriptive statistics, correlations and coefficient alphas among all study variables.

Hypothesis 1 postulates a direct effect between narcissistic leadership and follower voice behavior. This hypothesis was supported with significant direct effects (see Tables 2, 3), narcissistic leadership effect on voice behavior in Model 1 (*b effect* = 0.08, *p*=0.03); however, the direct effect was not significance for the moderated mediation model (Model 2) (*b effect* = 0.04, *p*=0.2). Moreover, the indirect effects of narcissistic leadership on voice behavior were significant for both Model 1 (indirect effect = 0.02, CI.95 = -0.039, -0.011) and Model 2 (indirect effect =-0.03, CI.95=-0.068, -0.006), indicating partial mediation (Baron and Kenny 1986). Therefore, the first hypothesis is supported.

Hypothesis 2 predicted that the two variables of surface acting, and emotional exhaustion will simultaneously mediate the relationship between narcissistic leadership and follower voice behavior in a way that surface acting is the first and emotional exhaustion is the second mediator. The results for Model 1 indicated that, first, the model with two mediators with no moderators is significant and the indirect effects of narcissistic leadership on follower voice behavior is conveyed by the two variables of surface acting and emotional exhaustion (indirect effect = 0.02, CI.95 = -0.039, -0.011). In Model 2, the moderated mediated model with two mediators showed a good index of model fit and indirect effects of the mediators were significant for diverse levels of both moderators.

In the conceptual model, attachment anxiety and attachment avoidance of followers moderate the relationship between narcissistic leadership and surface acting such that the indirect effect is stronger when attachment anxiety is high, and this indirect effect is weaker when attachment avoidance is high. Support was only found for the attachment avoidance of followers with significant interaction terms in the moderated-mediation models (see Tables 2, 3).

Table 2. Mediation and moderated mediation estimates for follower voices

Mediation model					
Direct effects	Coefficient	SE	t	p	Model R^2
Surface acting as DV					
Constant	1.73	.11	15.05	.0000	
Narcissistic leadership	.27	.04	6.42	.0000	.11 ***
Emotional exhaustion as DV					
Constant	1.29	.10	12.80	.0000	
Narcissistic leadership	.09	.03	3.15	.0018	.20 ***
Follower voice as DV					
Constant	3.39	.10	31.79	.0000	
Narcissistic leadership	-.08	.03	-2.12	.03	.01*

Mediation model					
Direct effects	Coefficient	SE	t	p	Model R^2
Indirect effect	Effect	Boot SE	Boot LLCI		Boot ULCI
Narcissistic leadership on followers voices	-.071	.018	-.111		-.039
Narcissistic leadership on followers voices	-.032	.015	-.067		-.007
Narcissistic leadership on followers voices	-.023	.007	-.038		-.011

Moderated-Mediation Model					
Direct effects	Coefficient	SE	t	p	Model R^2
Surface acting as DV					
Constant	2.11	.35	5.96	.0000	
Narcissistic leadership	.01	.12	.10	.91	
Avoidance attachment	-.15	.14	-1.06	.28	.15***
Narcissistic*Avoidance	.10	.04	2.25	.02	.01*
Conditional indirect effects	Effect	Boot SE	Boot LLCI		Boot ULCI
Low	-.0155	.0067	-.0305		-.0037
Mean	-.0229	.0072	-.0387		-.0105
High	-.0304	.0102	-.0528		-.0135
Index of moderated mediation	Index	Boot SE	Boot LLCI		Boot ULCI
Avoidance attachment	-.009	.005	-.022		-.0004

N = 305. Effect size estimates are unstandardized coefficients. Moderator values of low and high are the mean plus/ minus one standard deviation. Mean centering was used for product terms DV dependent variable, SE standard error, Boot 50,000 bootstrap samples, LLCI bias corrected lower limit confidence interval, ULCI bias corrected upper limit confidence interval
*** p<0.001

Table 3. Mediation and moderated mediation estimates for follower voices

Moderated-Mediation Model					
Direct effects	Coefficient	SE	t	p	Model R^2
Surface acting as DV					
Constant	.46	.39	1.17	.0000	
Narcissistic leadership	.45	.13	3.37	.0008	
Anxiety attachment	.49	.14	3.49	.0005	.18***
Narcissistic* Anxiety	-.07	.04	-1.71	.08	.007
Conditional indirect effects	Effect	Boot SE	Boot LLCI		Boot ULCI
Low	-.025	.008	-.045		-.010
Mean	-.020	.006	-.0342		-.009
High	-.014	.006	-.029		-.003
Index of moderated mediation	Index	Boot SE	Boot LLCI		Boot ULCI
Anxiety attachment	.006	.005	-.003		.019

N = 305. Effect size estimates are unstandardized coefficients. Moderator values of low and high are the mean plus/ minus one standard deviation. Mean centering was used for product terms DV dependent variable, SE standard error, Boot 50,000 bootstrap samples, LLCI bias corrected lower limit confidence interval, ULCI bias corrected upper limit confidence interval
*** p<0.001

For attachment avoidance, there was a significant positive interaction term on the narcissistic leadership to surface acting path (effect = 0.11, p=0.02). Moreover, the index of moderated mediation indicates that any two conditional indirect effects defined by different values of attachment avoidance are statistically different (index = -0.009, CI.95 = -0.023, -0.000). Comparison between the mediation and moderated-mediation models indicates an additional 4 % variance explained ($\Delta R^2 = 0.04$) in voice behavior. For attachment anxiety, there was not a significant interaction term on narcissistic leadership to surface acting path (effect = 0.28, p<0.001), as well as a not significant index of moderated mediation (index = 0.007, CI.95 = -0.003, 0.019). To delineate the presence of moderated mediation, the indirect effect at difference levels of the moderator was reported (1 SD below the mean, the mean, and 1 SD above the mean; cf. Aiken and West 1991). Table 2 illustrates these moderated indirect effects through changes in the level of attachment avoidance for voice behavior. Figure 2 graphically illustrates the magnitude of this indirect effect at continuous levels of the attachment avoidance moderator with a 95 % confidence band (cf. Bauer and Curran 2005). Although the index of moderated mediation was no significant, all levels of attachment anxiety have significant and increasingly stronger positive indirect effects. Figure 3 graphically depicts the magnitude of this indirect effect at continuous levels of attachment anxiety with a 95 % confidence band.
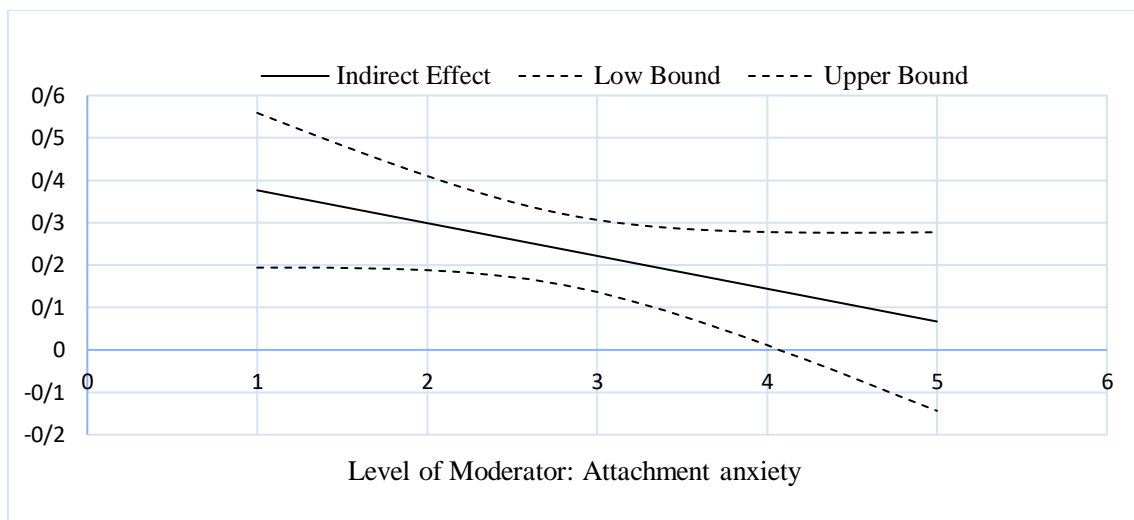

Figure 2. A plot of the indirect effect of narcissistic leadership on surface acting versus the moderator (Attachment Anxiety) with confidence bands. The horizontal line denotes an indirect effect of zero, while the vertical line represents the boundary of the region of significance
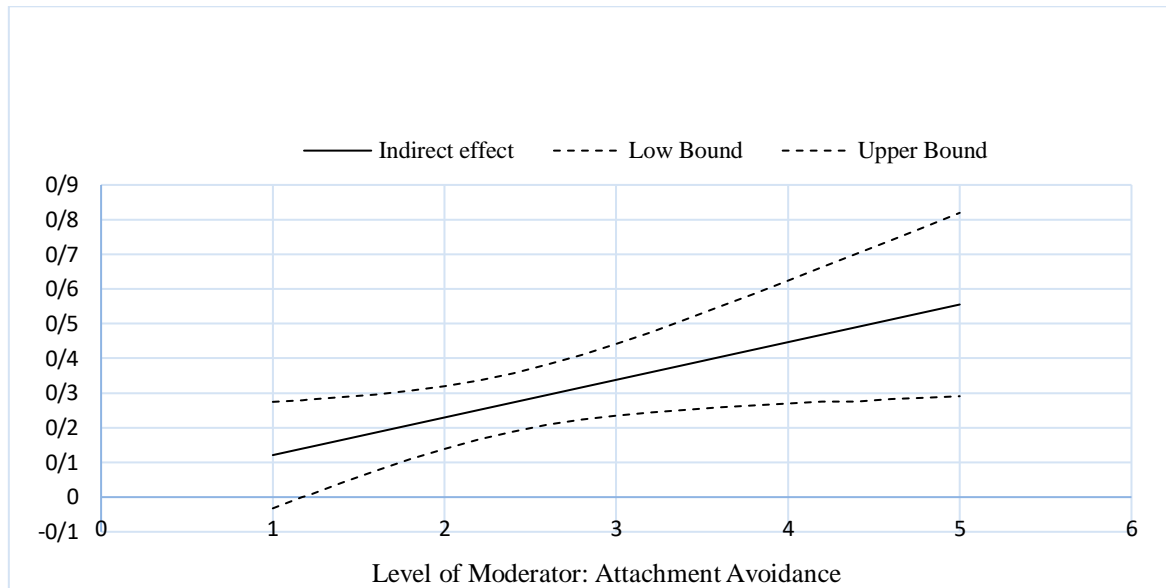
Figure 3. A plot of the indirect effect of narcissistic leadership on surface acting versus the moderator (Attachment Avoidance) with confidence bands. The horizontal line denotes an indirect effect of zero, while the vertical line represents the boundary of the region of significance

Discussion

Research has shown that narcissistic leadership has negative impact on a large number of followers 'outcomes, including followers' voices (Carnevale et al., 2018; Huang e al., 2020). however, the mechanism is not well depicted specifically through a socio-emotional mechanism (i.e., surface acting in this study) and a volitional factor (i.e., attachment styles); therefore, this study had some contributions to the literature of narcissism particularly narcissistic leadership, emotional labor and attachment theory. First, according to the COR theory, it was shown that the effect of leader's narcissism can impair followers' voice behavior via the full mediation of surface acting and emotional exhaustion. Second, through using the attachment style theory, we identified that only avoidance functions as a moderator in the relationship between narcissistic leadership and surface acting.

Theoretical implications

The study's findings showed that narcissistic leadership increases surface acting as emotional labor which in return causes a decline in emotional exhaustion. This is consistent with the findings of Zhang, Zhou, Zhan, Liu & Zhang (2018), postulating that surface acting depletes emotions. This finding elaborates further on the mechanism narcissistic leaders cause emotional exhaustion. More specifically, in an Iranian culture, in which power distance is high (Javidan & Dastmalchian, 2003), surface acting can be the best resort to maintain emotional resources when there is no good prospect of expressing ideas to those who deem themselves 'idols' in diverse fields, specifically their profession. It is noteworthy to mention that when attachment styles are not considered, narcissistic leadership both directly and indirectly via surface acting emotional exhaustion undermine voice behavior of followers and this implies the deleterious effects of narcissism in the dyadic relationship of leaders and followers.

Due to the excessive need for praise and respect from their followers (Raskin et al., 1991), narcissistic leaders better communicate with those who meet these needs and repress those who criticize them (Harms & Spain, 2015; Spain et al., 2014). Therefore, followers take countermeasures to prevent potential threats. This is consistent with the COR literature because individuals take steps to conserve resources when faced with stressful situations. Our findings on the positive relationship between leader narcissism and surface acting adds to the narcissism literature by suggesting that narcissistic leaders create stressful conditions for followers and followers try to adhere to organizational policies, emotional norms, and better communication show good organizational feelings (Prati et al., 2009).

Second, although the issue of follower voice and related research streams has recently expanded, there is still no understanding of the dynamics of sound and the path that takes place between levels and mechanisms (Townsend, Wilkinson, Dundon & Mowbray, 2020). Our study is the first research on the characteristics of followers that can block their voice by a special mechanism. Therefore, extends the nomological network of voice behavior by identifying the narcissism leader as a predictor of the followers; voice and investigates double mediators through which the impact of narcissistic leadership to less voice behavior from the followers' side. Looking through the lens of emotional exhaustion, followers who experience emotional exhaustion may make less voice to maintain what is left of their wasted energy (Bolino & Turnley, 2005). Our findings show that narcissistic leaders, due to the depletion of their followers 'emotional and cognitive resources, firstly, cause surface acting and surface acting then causes emotional exhaustion. To the best knowledge of the authors, this study is among the first to investigate this cascading impact hampering followers' voice behavior, particularly in the context of educational environments where the voice of the followers is of considerable importance.

Although recent research has sought to discover the characteristics of leaders and followers moderating their impact on followers (Galvin et al., 2015; Owens et al., 2015; Spain et al., 2014), this study is one of the first studies to focus on the personal characteristics of followers, including attachment style, to moderate the effects of narcissistic leadership. Relying on attachment theory and the fact that attachment style plays a role in the stress of an event (Sung, Nam & Hwang, 2020; Ingram & Luxton, 2005), our results suggest that people with high avoidance attachment styles are less prone to harm from narcissistic leaders and are less inclined to surface act. In terms of moderation, it was found that avoidance attachment moderates the relationship between narcissistic leadership and surface acting. This suggests that avoidance attachment mitigate the negative impact of narcissistic leadership on surface acting. In other words, when attachment avoidance is higher, this high level of avoidance (i.e., fear of dependency) can decrease surface acting. Research has already shown that attachment avoidance is negatively related to disclosure tendencies in daily events (Garrison, Kahn, Miller & Sauer, 2014). This negative relationship with emotional enclosure is in contrast with the definition of surface acting, which can ultimately reduce emotional exhaustion and increase voice behavior. Moreover, even after the consideration of diverse levels of attachment avoidance, the moderated mediated model was verified. On the other hand, we expected anxiety attachment to moderate the relationship between narcissistic leadership and surface acting, so that when narcissistic leadership was high and anxiety attachment was low, followers were less likely to turn to surface acting. Unexpectedly, for individuals with low anxiety attachment, the indirect effects of narcissistic leadership on followers' voices via surface acting and emotional exhaustion were not significant. Based on the vigilance-avoidance theory, in the face of threating stimuli, anxious individuals will raise their vigilance to threat and later deter form attending to the threatening stimuli (Armstrong & Olatunji, 2012; Asmundson & Stein, 1994; Koster et al., 2005; Mogg & Bradley, 2002; Rohner, 2002). This lack of consistency in their behavior may cause the moderation of attachment anxiety to lose its significance.

Limitations and Future Directions

There are several limitations to this research that may indicate directions for future research. First, although the hypotheses of this study are largely bolstered, the direct impact of narcissism on voice behavior was not supported. Future research may therefore replicate our conceptual model with different and more valid measurements for voice behavior and leader narcissism. Although the survey data was selected from different universities, the average leader narcissism was low. It is likely that the participants answered the questions based on those classes and teachers which whom they had better educational experience. Therefore, future research may select some random classes and ask the students to rate their questions based on those restricted classes. This can reduce the bias emanating from the desired perceptual selection. Second, in this study only focused on one outcome of leader narcissism (i.e., voice behavior) and other dependent variables were not considered. Future research may consider mental health because of surface acting, thereby lowering voiced to reduced well-being (Totterdell & Holman, 2003). Future research may propose other mechanisms and outcomes of narcissistic leadership. Third, the data of this study was collected from the academic environmental though some researchers have emphasized on the analogy of leader-follower and professor-student relationships (e.g., Colquitt, Lepine & Wesson, 2014). Since the method was not experimental and the data were cross-sectional, causal inferences may not be deduced. Future research can use experimental methods to collect data and help the detection of causality.

Conclusion

This study began to answer the question of how narcissistic leaders repress followers and when the attachment styles followers that can prevent them against this harm. The findings of the present study showed that narcissistic leaders, by creating stressful conditions, trigger emotional labor, including surface acting in followers, and surface acting leads to emotional exhaustion, and ultimately these factors reduce the voice of followers. The results of this research also showed that only high avoidance attachment style can reduce the positive effect of leader narcissism on surface acting which ultimately mitigate the impact of leader narcissism on followers' voice.

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Original Research

Technical Efficiency of Community Clinics in Kushtia, Bangladesh: A Nonparametric DEA Analysis

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Abstract

The healthcare industry is well aware of the issue of limited resources. By properly managing available resources, waste may be minimized. Bangladesh is a developing nation with limited resources, hence it is essential to estimate technical efficiency in this circumstance. Health care efficiency in the developed world has long been examined using Data Envelopment Analysis (DEA). However, few studies have used DEA to evaluate the effectiveness of healthcare delivery in emerging economies, especially in Bangladesh. A total of 24 community clinics in Kushtia were chosen at random for this study, and their technical efficiency was determined using the DEA method. The goal was to assess health centers' levels of efficiency and provide recommendations for improving less effective centers' performance. Input-based Data Envelopment Analysis was utilized to evaluate technical efficiency. The first category comprised of twelve prominent public hospitals. In this study, the number of outpatient visits was both an input and an outcome variable, whereas physicians, nurses, drugs, and other medical supplies were input variables. The Malmquist index was also utilized to assess efficiency gains and losses over time in community clinics. The eleven surviving community health clinics ended just inside the border. Based on their average efficiency rating, the facilities could accomplish the same goals while consuming 42% less inputs. On average, each CC created garbage worth TK. 0.14 crore. Across the board, production grew during the study periods. Overall, the findings suggest that public health centres are extremely inefficient in their delivery of health care and that substantial savings may be achieved by implementing steps to reduce waste.

Keywords: Technical efficiency, Data Envelopment Analysis, Community clinic, Malmquist productivity index (MPI).

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Introduction

Bangladesh's population density per square kilometer is high (Ministry of Planning, 2022). Consequently, it is challenging to guarantee that all citizens have access to professional medical care. The Health Bulletin 2020 depicts a health-care system that offers primary care to rural inhabitants living below the Upazila (sub-district) level, as well as secondary and tertiary treatment in districts and big cities. Urban populations also have access to primary care (DGHS, 2019). There are three primary types of health care facilities: community clinics, union health and family welfare centers, and upazila health complexes (UHCs). Community clinics are the most frequent form. Community clinics, or CCs, serve as the first point of contact for patients in Bangladesh's primary healthcare system. Approximately 6,000 to 12,000 rural residents benefit from the CCs' centralized location and the varied services they offer. By the end of 2022, 13,907 CCs will be completely functioning across the nation. In addition, it is the responsibility of CCs to provide essential services to the local population in their respective territories, with a particular emphasis on vulnerable women and children. Between 9.5 and 10.0 million individuals in need of medical assistance attend community clinics each month (DGHS, 2019). Community clinics are at the forefront of healthcare delivery because they offer primary care, as well as maternity and child health services, to people in need. In addition to these services, Union Health Center refers patients who require more extensive medical care or urgent assistance to more technologically equipped facilities (DGHS, 2019). The Sustainable Development Goals (SDGs) can only be attained by a developing nation if the relatively meager resources typically allocated to the health sector are utilised effectively. Utilizing efficiency metrics enables the identification of inefficient facilities and input gaps, which may then guide policymakers and facility managers toward more effective waste reduction and productivity gains (Kirigia et al., 2004). Multiple studies have demonstrated that even modest increases in operational efficiency may result in substantial cost reductions in the healthcare industry. According to the 2010 World Health Report, 20 to 40 percent of global healthcare spending is wasted due to inefficiency (WHO, 2019). According to the conclusions of the study, Bangladesh's medical facilities are not nearly as effective as they may be (Mahmood, 2012). A significant amount of research has been undertaken on the application of data envelopment analysis in healthcare organizations, with multiple studies demonstrating positive outcomes (DEA). The great majority of these studies were done only in developed nations, according to the relevant published literature. Despite a recent surge in the number of studies examining the technical effectiveness of healthcare facilities in developing nations, no such studies have been undertaken in Bangladesh. This study's objective was to assess the levels of CC efficiency using the data envelopment analysis (DEA) model, and then to utilize the Malmquist index to monitor the evolution of CC efficiency through time.

However, Community clinics play a vital role in providing primary healthcare services to rural populations, particularly in low-income countries with limited healthcare resources. In Bangladesh, where access to quality healthcare is a persistent challenge, community clinics serve as essential healthcare providers, especially in remote areas. However, assessing the technical efficiency of these clinics is crucial to ensure effective allocation of limited resources and enhance healthcare delivery. This research aims to evaluate the technical efficiency of community clinics in Kushtia, Bangladesh, using a

nonparametric Data Envelopment Analysis (DEA) approach. The analysis reveals variations in technical efficiency across community clinics in Kushtia. Some clinics operate at near-optimal levels, while others exhibit substantial inefficiencies. Factors contributing to these disparities are discussed, such as resource allocation, staff capacity, and management practices. The findings provide valuable insights for policymakers and healthcare stakeholders in Kushtia, Bangladesh. The identification of inefficiency sources allows for targeted interventions to enhance the technical efficiency of community clinics, thus improving the quality and accessibility of primary healthcare services. The empirical analysis employing a nonparametric DEA approach provides insights into the technical efficiency of community clinics in Kushtia, Bangladesh. The results highlight variations in efficiency levels and shed light on potential areas for improvement. By addressing these inefficiencies, policymakers and healthcare providers can enhance the effectiveness of community clinics, ultimately leading to improved healthcare outcomes for the local population

Research Goals

The primary goal of this research is to assess the technical efficiency of community clinics in Kushtia, Bangladesh. Specifically, the study aims to achieve the following objectives:

1. Measure the technical efficiency: The research seeks to evaluate the efficiency levels of individual community clinics by measuring their ability to maximize outputs given a set of inputs. By employing the DEA methodology, this research will provide insights into the relative efficiency of each clinic, highlighting the best-performing clinics as well as those that are underperforming.

2. Identify key determinants of efficiency: Apart from measuring efficiency, this study aims to identify the key determinants that influence the technical efficiency of community clinics. By analyzing various input and output factors, such as the number of healthcare professionals, available medical equipment, patient visits, and health outcomes, the research will shed light on the factors that contribute to or hinder clinic efficiency.

3. Provide policy recommendations: The research aims to offer evidence-based policy recommendations to improve the technical efficiency of community clinics in Kushtia, Bangladesh. These recommendations will be derived from the findings and analysis of the study, focusing on strategies to optimize resource allocation, enhance service quality, and improve healthcare outcomes in the region.

Literature review

The technique of applying Data Envelopment Analysis (DEA) has been applied in various occasions to evaluate the relative production performance of profit and non-profit Production and service units. The non-parametric method has also been used Along with other parametric methods. In this chapter (the literature review part is Discussed and presented briefly based on applications to the following broad sectors:

The classical and initial view of DEA Analysis

Farrell (1957) presents the relative efficiency notion, which states that a decision making unit's (DMU) efficiency may be measured by comparing it to the efficiency of other DMUs in the same group. Data Envelopment Analysis was presented by Charnes, Cooper, and Rhodes (1978) as a linear programming tool for evaluating efficiency (DEA). Since the mid-1980s, Data Envelopment Analysis has become a prominent method for assessing the efficiency of many businesses. The original DEA model, proposed by Charnes et al. (1978), is known as the CCR Model, and it assumes a constant return to scale (CRS), which means that changes in a DMU's outputs are proportional to changes in its inputs. Furthermore, Banker, Charnes, and Cooper (1984) proposed the BCC model based on the variable returns to scale (VRS) assumption, which states that changes in a DMU's outputs may not occur in the same proportion as increases in its input levels.(Atici & Podinovski, 2015) said a tool called Data Envelopment Analysis (DEA) has been used to figure out how efficient a Decision-Making Unit (DMU) is compared to other DMUs that are the same.(Fried, Lovell, & Schmidt, 2008) discussed that, this method has been used extensively in the past to investigate the relative efficiency of homogeneous units. (Kundi & Sharma, 2016) told that primarily, the DEA technique was used to evaluate the effectiveness of non-profit organizations such as hospitals, educational institutions, and government agencies. Later on, the area of DEA application expanded, and this technique is now being used to analyze the performance of profit-driven enterprises. For example, DEA is used to assess the performance of service sector firms such as banks and software industries, as well as manufacturing industries such as textile and mining industries. Furthermore, DEA is utilized to assess the efficacy of various countries. (Goyal et al., 2017).

DEA application in different sectors

DEA analysis Bank and financial institution

In this section, DEA analysis of the bank and other financial institutions' performance efficiency has been featured. Staub, R. B. et al. (2010) studied Brazilian banks' cost, technical, and allocation efficiencies over the year (2000–2007). In order to compute efficiency ratings, they employed the DEA dynamic panel data input-oriented CCR model. Brazilian banks were found to be less efficient than their counterparts in Europe and the US and government banks are more cost-efficient than overseas, private local and private with foreign participation. Jelena Titko et al. (2014) updated the approach for assessing Latvian banks' efficiency. Data Envelopment Analysis, a non-parametric frontier technique, was used to calculate efficiency scores (DEA). The Variable Returns to Scale (VRS) Method was applied with an input-oriented DEA model. Khan, Z., and Sulaiman, J. (2015) analyzed the social and financial efficiency of Pakistani microfinance organizations in order to propose optimal solutions for efficiently and self-sustainingly financing to non-bankable people. The study used input-oriented CCR and BCC models with 19 different DEA models and three input and four output variables signifying various MFI factors such as price structure, business structure, and managerial characteristics. Gökgöz, F. (2010) measured and compared how efficient Turkish securities and pension funds were in the 2006–2007 period. In this scenario, 36 SMFs and 41 PMFs were examined using typical portfolio performance indicators and DEA models. According to

performance indexes and DEA models, PMFs outperformed SMFs in 2006–07. By way of a result, the input-oriented CCR and BCC models were used, and in the DEA applications, one output (the additional return of the funds) and four inputs (cost ratio and income) were used in each the four DEA applications. Murthi et al. (1997) The DEA method was applied to 731 mutual funds and the findings were compared to traditional performance measures such as the Sharpe index. They looked into the mutual fund industry's financial market efficiency and used DPEI (DEA Portfolio Efficiency Index) to create a benefit/cost non-parametric study. They found that DPEI measures of performance are equivalent to traditional indices while giving significantly more flexibility. Basso and Funari (2000) they utilized DEA models to evaluate the performance of 47 mutual funds in the Italian financial industry Between the period 1997 and 1999.Berger, and Humprey (1997) used input-oriented CCR and BCC DEA techniques on 130 different financial institutions in 21 countries, concluding that it aids in the identification of corporate goals and objectives in order to improve financial institution efficiency.P. Pille and J. C. Paradi (2002) created BCC input-oriented Models in order to uncover flaws in Credit Unions in Ontario, Canada, in order to predict probable financial failures. Four data envelopment analysis (DEA) models are used to compare the equity to asset ratio and the government regulator's significantly modified "Z-score" model. As a result, each Financial Institution is assessed to a peer group of functional organizations from whom the management of the inefficient institution can learn to

Improve productivity. Ahn, H., & Le, M. H. (2014) addressed DEA's problems in the context of evaluating bank efficiency, with an emphasis on performance factor specification. They are determining if the input-output definition for banks in DEA applications is consistent with the decision-making criteria used by banks. The efficiency test was completed using output-oriented CCR and BCC models.

DEA use in Agriculture production sector

Bayyurt, N., & Yılmaz, S. (2012). They integrated DEA and regression analysis in a broader aspect for their investigation. To do this, they employed the DEA (output-oriented, constant return to scale model) to examine the agricultural efficiency of countries in the first stage. And then, in the second stage, they employed Panel Data Regression Analysis to determine the effects of the Worldwide Governance Indicators (WGI), the education index, and the nation type on country efficiency. Zamanian, G. R. et al. (2013) They examined the technical efficiency of the agriculture sector in MENA countries between 2007 and 2008 utilizing Data Envelopment Analysis (DEA), input-oriented CCR and BCC models, and Stochastic Frontier Analysis (SFA) techniques. Additionally, empirical evidence indicates that both parametric and non-parametric techniques produce the same ranking of countries.Frija, A et al. (2009) the authors offer a measure for irrigation water use efficiency (IWUE) based on an alternate variant of the data envelopment analysis (DEA) paradigm. Second, a tobit model is employed to examine the relationship between technical efficiency and IWUE. Input-oriented constant returns to scale (CRS) and variable returns to scale (VRS) efficiency ratings reveal that most farmers in our sample are producing efficiently. Raheli, H et al. (2017) used a two-stage methodology. As a result, a non-parametric input oriented CCR and BCC Data Envelopment Analysis (DEA) were used in the initial stage to examine the efficiency of tomato production, and a fractional regression model (FRM) was utilized in stage 2 to

analyze farm-specific variables. Yadava, A. K., & Komaraiah, J. B. (2021) the study used data from 21 Indian states from 2016 to 2017, with the states serving as decision-making units for performance evaluation. In the first step, the Data Envelopment Analysis (DEA) method of performance evaluation is used. In the second stage, they evaluated the efficiency of "pure organic production" and corrected the bias in the standard DEA technique with the bootstrap DEA method. As per the input-oriented DEA model, organic farming production has an average technical efficiency of 84.7 per cent, whereas the output-oriented DEA model has a 20% technical efficiency, meaning that organic farming production could be increased by 80% with the same number of inputs.

DEA analysis in Health Sector

Kassam, A. H. (2017) by using (CCR) input-oriented and output-oriented measurement models, they were able to figure out the relative efficiency. Another perspective is that the study looks at hospital efficiency and productivity from two different viewpoints: first, Data Envelopment Analysis (DEA) is used to evaluate the relative efficiency of hospitals using the (CCR) approach, and second, the study looks at hospital efficiency and productivity from two different perspectives. Second, the Luenberger Productivity Indicator (LPI) is used to determine how much productivity has increased over time. Mirmirani, S., & Lippmann, M. (2004) they used Data Envelopment Analysis to examine the health-care delivery systems of G12 countries, finding that Japan and Spain had the highest relative efficiency and the United States had the lowest. For the years 1991-1995, DEA tests were conducted utilizing both input-oriented CCR and BCC models. Wei, C. K et al. (2011) they developed input-oriented BBC and CCR models to examine Taiwan's medical sectors, and they discovered that efficient DMUs' efficiency underestimate is more problematic than inefficient DMUs'. Furthermore, when weights are concentrated in the same output, underestimation occurs. Carrillo, M., & Jorge, J. M. (2017) they analyses efficiency in the health sector using the CCR input output oriented Data envelopment analysis (DEA) approach. Given the observed level of health outcomes, this study analyses data from the relevant health authority in Spain to assess the efficiency of regional health systems in Spain and identify those regions that are employing their health care inputs more efficiently than others. Mogha, S. K (2014) This article examines the efficiency of 27 public sector hospitals in the state of Uttarakhand (India) for the calendar year 2011 utilizing the output-oriented models DEA-CCR and BCC, as well as the DEA's new slack based model (NSM), which deals directly with input and output slacks. Dash et al. (2010) Used CCR and BCC input-oriented models and examine the technical and scale efficiencies of 29 local hospitals in Tamil Nadu for the years 2004–2005. Mogha et al. (2012). They evaluate the technological and scale efficiencies of 55 Indian private hospitals in 2010 using CCR and BCC output-oriented models. Ismile (2010) they analyze the technical efficiency of Sudan's state-level health agencies using DEA-based CCR and BCC models.

DEA analysis for Manufacture industry

Li, L et al. (2013) To create an upgraded super-efficiency DEA model, they combined the standard input-oriented CCR model, the super-efficiency DEA model, and the ideal-DMU-based benchmark sorting model which was then applied to a real-world problem. After that, they investigated the method on 10 subsidiaries of a well-known domestic

energy company to see if it was viable to implement. Buyukkeklik, A. et. al (2016) Input-oriented CCR and BCC models were used in their study because they examined the resource of company efficiency. The CCR model was used to determine the

Overall efficiency values of each decision-making unit based on the years, the BCC model was used to calculate the technical efficiency values, and the scale efficiency values were produced by comparing these values to one another. As a result, resource efficiency providers are uncommon among the BIST SME Industrial Index's enterprises, and these companies may attain their present total sales and profitability levels with fewer resources. Emran, S. J., & Moniruzzaman, M. (2020) This study use the output-oriented DEA model to capture the maximum proportional increase in production while maintaining input levels constant. Furthermore, DEA is utilised in this study under two alternative assumptions: constant and variable returns to scale. This study will also examine the dynamics technical production efficiency in Bangladesh's manufacturing sector using cross-sectional data from the Survey of Manufacturing Industries (SMI) performed in 2006 and 2012. Using the Stochastic Frontier Analysis (SFA) method with Cobb-Douglas model and a half-normal distribution, the dynamics of mean efficiency scores across industries were estimated. Khan, A. H., & Farooq, S. (2019) The technological efficiency of listed spinning enterprises on the Pakistan Stock Exchange is assessed in this study (PSX). The Input Oriented Data Envelopment Analysis technique was used for this, with the Variable Return to Scale (VRS) assumption. For the years 2011 to 2016, balanced panel data from 55 firms was obtained. According to the conclusions of the study, only one out of 55 organizations was able to achieve an efficiency score of one during the course of the six-year study period. Athanassopoulos, A. D., & Ballantine, J. A. (199) they used CCR and BCC both input and output-oriented data envelopment analyses to address a number of topics related to corporate performance measurements, such as determining sales efficiency, the effects of economies of scale, measuring a company's performance, and the link between industry groups and performance Chapelle, K., & Plane, P. (2005) using the Data Envelopment Analysis production frontier technique, they assessed the technical efficiency of Ivorian manufacturing businesses in four industries: textiles and apparel, metal goods, food manufacturing, and timber and furniture. When computing efficiency scores, the influence of the external working environment is taken into account. Khan, M. N. et al. (2018) Using Data Envelopment Analysis, this article evaluates the efficiency of listed corporations on the Pakistan Stock Exchange (DEA). The purpose of using and calculating the DEA score is to determine how efficient enterprises are at converting their resources into output (sales/net income). Düzakın, E., & Düzakın, H. (2007) they used an Output-oriented super slack based model in DEA, which meant that the outputs could be negative or not at all. Furthermore, the model can help you figure out which businesses are the most efficient. People who did this study looked at data from 500 of the most important factories in Turkey to use the Output-oriented method. Ahmed, S. N. (2009) the goal of this study was to examine the "performances" of the Bangladeshi garment sector and to determine the most efficient frontier. The relative scores of the productive efficiency of several apparel manufacturers were determined using input and output-oriented models for both constant and variable return to scale, Scale efficiency, Malmquist Productivity index and SBM model. The most efficient production periods (months) have been determined based on the efficiency measurement scores.

Method of the study

The purpose of this article was to evaluate the effectiveness of CCs at the district level in Bangladesh. Using a data envelopment analysis (DEA) model with an input-focused constant returns to scale (CRS) measure, the technical efficacy was evaluated. The Malmquist index compares the performance of CCs over time in order to identify changes. Depending on the used technologies, "technical efficiency" in this sense refers to the capacity of a corporation or industrial unit to maximize output while minimizing inputs (Henderson and Quandt, 1980). Analyses of the Accompanying Data (DEA) Data Envelopment Analysis (DEA) is a non-parametric approach that aims to maximize the weighted output-to-weighted input ratio for a particular business, provided that the ratio cannot exceed one for any other firm. This method may be used to evaluate the technological effectiveness of various firms. Any evaluable phase of the manufacturing process is a "Decision-Making Unit" (DMU). In this situation, each CC is considered a separate DMU. The ratio of outputs to inputs is the fundamental efficiency statistic for the DEA (Cooper et al., 2007). xi and yr represent the ith input and rth output of a DMU, respectively. Let vi and ur represent the weights assigned to the inputs and outputs, and let m and s represent the total number of inputs and outputs, where m and s are greater than 0. (Rao, 2003).

The CCR model, which was developed by Charnes, Cooper, and Rhodes, is the earliest and most fundamental kind of data envelopment analysis (1978). The original model established by Charnes Cooper and Rhodes correlated efficiency with (CCR). The model uses the highest ratio between a DMU's weighted outputs and weighted inputs to assess its efficiency. The ratios of each DMU are adjusted such that their aggregate is less than 1. (Kale, 2009: 64). This Charnes et al. (1978:430)-developed

CCR fractional programming paradigm is based on user input.

$max,$

$$h_k = \frac{\sum_{r=1}^{s} u_r\, y_{rk}}{\sum_{i=1}^{m} v_i\, x_{ik}} \tag{1}$$

Constraints:

$$\frac{\sum_{r=1}^{s} u_r\, y_{rj}}{\sum_{i=1}^{m} v_i\, x_{ij}} \leq 1 \qquad j = 1, \ldots \ldots, n \tag{2}$$

$$u_{r,}\, v_i \geq 0 \qquad r = 1, \ldots \ldots, s \quad i = 1, \ldots, m \tag{3}$$

$$\text{Max} \quad z = \sum_{r=1}^{s} u_r y_{rk} \tag{4}$$

$$\text{Constraint: } \sum_{i=1}^{m} v x_{ik} = 1 \tag{5}$$

$$\sum_{r=1}^{s} u_r y_{rj} - \sum_{i=1}^{m} v x_{ij} \leq (j = 1, \ldots \ldots, n) \tag{6}$$

$$u_{r,}\, v_i \geq 0 \qquad (r = 1, \ldots \ldots, s) \quad (i = 1, \ldots, m) \tag{7}$$

Before evaluating the effectiveness of DMU, its model must be constructed and solved. The objective function value after issue resolution represents the Total Technical Efficiency of the relevant DMU (TTE). Technical efficiency measures the output-to-input ratio of a DMU. DMU is active if the value of the objective function is 1 (z=1) and inactive if it is less than 1.

Malmquist productivity index (MPI)

A productivity index measures the effectiveness of a DMU over time. Caves, Christensen, and Diewert created the MPI to determine if productivity in DMUs was rising or declining (Caves et al., 1982). Changes in total factor productivity (MPI) broken down by new technologies and minor advances in technical efficiency (TEC) (TC). PTEC and TEC can be used to differentiate changes in technical efficiency (TEC) on a greater scale (SEC).

TFPC = TEC X TC = (PTEC X SEC) X TC

Study design and data collection method

The Efficacy of Means (DEA) score measures the effectiveness of a method. Numerous DMUs are required for it. It is easier to differentiate between efficient and inefficient DMUs when the sum of their inputs and outputs is less than their total number. In general, DMU should be more than the sum of its inputs and outputs (Charnes and Cooper, 1978). The study's core data came from twenty-four CCs, and there was only one input and one output. The primary criterion for selecting UHCs was an approximate ratio of providers to the populations they served. Using the Local Health Bulletin 2022, we computed the ratio for a sample of CCs in the Bangladeshi district of Kushtia (DGHS, 2022). Total number of CC are 52 in Kushtia district as population, so 24 UHCs were therefore chosen to participate in the study as a sample. Under the assumption of continuous returns to scale, the DEA Solver was utilized to build an envelope input-oriented model (CCR model). What you put in it will likely impact its performance. The only component analyzed for the study was human resources, and the only finding was the number of outpatient visits. A facility survey was conducted according to standard data collection protocols in order to acquire input data. Utilizing their service statistics, the performance of community clinics was assessed.

Outcome of the tests

Levels and determinants of resource use efficiency at the Community Clinics (CCs)

According to the output-oriented DEA efficiency score, only one of the twenty-four CCs achieved a flawless score of twenty (=20) out of a possible twenty. Figure 1 illustrates the DEA's efficiency scores. Nine of the CCs scored below average, bringing the overall average score for efficiency to 42%. The facility with the best overall performance is the Saldah, Community clinic. It earned a one on the scale of efficiency. The remaining fifteen CCs scored less than one (1) on the efficiency scale and might become more efficient by reducing their inputs.

Table 1. DEA efficiency scores of the survey CCs

CC	Efficiency score	Returns to scale
Daikhalipara, Community Clinic	0.31	Increasing
Pantapara, Community Clinic	0.44	Increasing
Piarpur, Community clinic	0.75	Increasing
Khordo Ailchara, Community clinic	0.68	Increasing
Naopara, Community clinic	0.51	Increasing
Rajapur, Community clinic	0.42	Increasing
Shimuliya kathuliya, Community clinic	0.62	Increasing
Sankardia, Community clinic	0.70	Increasing
Uttar magura, Community clinic	0.87	Increasing
Berbaradi, Community clinic	0.13	Increasing
Purba, Abdalpur, Community clinic	0.55	Increasing
Padmanagar, Community clinic	0.61	Increasing
Char Raghunathpur, Community clinic	0.81	Increasing
Hatosh Haripur, Community clinic	0.37	Increasing
Kantinagar Boaldah, Community clinic	0.70	Increasing
Saldah, Community clinic	1.00	Constant
Khajanagar, Community clinic	0.45	Increasing
Vadalia, Community clinic	0.64	Increasing
Astanagar, Community clinic	0.72	Increasing
Majpara, Community clinic	0.57	Increasing
Balipara ,Community clinic	0.29	Increasing
Kanchanpur, Community clinic	0.67	Increasing
Arpara, Community clinic	0.72	Increasing
Hatibhanga ,Community clinic	0.62	Increasing

Table 1 displays the DEA findings for the CCs. Uttar magura, Community clinic gets the highest rating (87%) among the least effective CCs. This CC can only improve its efficiency by 13% if it reduces its inputs. Even though Berbaradi, Community clinic received the lowest total score. Only 13% of the job was satisfactory. This CC might reduce its inputs by 87% without sacrificing output quality.

Table 2. The amount of waste at the survey CCs

Name of CC	Efficiency score	Input reduction %	Waste (in crore TK.)
Daikhalipara, Community Clinic	0.31	59	0.51
Pantapara, Community Clinic	0.44	56	0.39
Piarpur, Community clinic	0.75	25	0.17
Khordo Ailchara, Community clinic	0.68	32	0.31
Naopara, Community clinic	0.51	49	0.21
Rajapur, Community clinic	0.42	58	0.55
Shimuliya kathuliya, Community clinic	0.62	38	0.25
Sankardia, Community clinic	0.70	30	0.27
Uttar magura, Community clinic	0.87	13	0.19
Berbaradi, Community clinic	0.13	87	0.25
Purba, Abdalpur, Community clinic	0.55	45	0.21
Padmanagar, Community clinic	0.61	39	0.39
Char Raghunathpur, Community clinic	0.81	19	0.12
Hatosh Haripur, Community clinic	0.37	63	0.23
Kantinagar Boaldah, Community clinic	0.70	30	0.36
Saldah, Community clinic	1.00	0	0.00
Khajanagar, Community clinic	0.45	55	.24
Vadalia, Community clinic	0.64	36	.21
Astanagar, Community clinic	0.72	28	.45
Majpara, Community clinic	0.57	43	.65
Balipara ,Community clinic	0.29	71	.27
Kanchanpur, Community clinic	0.67	33	.82
Arpara, Community clinic	0.72	28	.41
Hatibhanga ,Community clinic	0.62	38	.23

It was determined how much waste was created by the inefficiency of the CCs. Table 2 displays the amount of waste produced by each CC. Kanchanpur, Community clinic contained the most garbage, while the Char Raghunathpur, Community clinic contained the least. The average price for waste was TK. 0.14 crore per cubic meter. Therefore, the government may need to spend less money to maintain the same degree of efficiency. Between 2019 and 2022, it is anticipated that waste from all CCs in Bangladesh would equal TK 1,910,37 crores, or 17.5% of the country's total health expenditures. The government's contribution to the budget of each CC is negligible. CCs also receive money from several other sources, in varying quantities. Due to this waste, it is feasible to achieve the same level of efficiency at a lower cost.

Table 3. Slacks and targets of inputs and outputs at the survey CCs

Name of CC	Input slack	Output slack	Efficient input target	Efficient output target
Daikhalipara, Community Clinic	52083	3569	22044	7011
Pantapara, Community Clinic	17536	2158	35699	6589
Piarpur, Community clinic	6221	2569	52369	1225
Khordo Ailchara, Community clinic	10401	2589	45982	9698
Naopara, Community clinic	22586	5695	14569	54441
Rajapur, Community clinic	36958	3698	89632	1235
Shimuliya kathuliya, Community clinic	25699	4583	28963	5148
Sankardia, Community clinic	15988	1235	26987	48695
Uttar magura, Community clinic	25984	4586	12359	56975
Berbaradi, Community clinic	58963	3657	11158	6699
Purba, Abdalpur, Community clinic	12358	2589	22598	4896
Padmanagar, Community clinic	16985	4782	36987	5679
Char Raghunathpur, Community clinic	10289	3259	86936	12568
Hatosh Haripur, Community clinic	36592	4536	96358	15997
Kantinagar Boaldah, Community clinic	12569	5369	89536	1698
Saldah, Community clinic	0	0	78956	25986
Khajanagar, Community clinic	2581	2589	68956	444789
Vadalia, Community clinic	69852	1235	58963	75556
Astanagar, Community clinic	25975	7832	78963	48658
Majpara, Community clinic	45869	2569	96358	71236
Balipara ,Community clinic	35896	1235	56963	17896
Kanchanpur, Community clinic	25869	5693	45968	25869
Arpara, Community clinic	58687	2358	23695	10236
Hatibhanga ,Community clinic	75692	3658	78965	17039

The deficiencies and anticipated levels of inputs and outputs from the survey CCs are displayed in Table 3. Input slack was greatest at the Hatibhanga, Community clinic, whereas output slack was greatest at the Padmanagar, Community clinic. The law of growing returns to scale was the business model of every inefficient CC. Since there was only one excellent CC, Saldah, Community clinic was used as a comparison site by less productive colleges. The inefficient CCs can be made efficient by adjusting the current input and output values to the appropriate level. Rajapur, Community clinic was among the least successful CCs. It had more input and output goals than less productive organizations.

Table 5. Malmquist Index summary of facility means of the survey CCs

Name of CC	EFFCH	TECHCH	PECH	SECH	TFPCH
Daikhalipara, Community Clinic	1.512	1.05	1.0	2.47	3.23
Pantapara, Community Clinic	1.124	1.02	1.69	1.12	1.56
Piarpur, Community clinic	0.812	1.03	1.25	0.77	1.04
Khordo Ailchara, Community clinic	2.102	1.02	1.21	3.58	3.25
Naopara, Community clinic	3.442	1.23	1.45	3.63	3.56
Rajapur, Community clinic	7.052	1.14	1.0	5.06	5.36
Shimuliya kathuliya, Community clinic	2.523	1.12	1.03	1.42	3.12
Sankardia, Community clinic	1.452	1.17	1.18	5.23	5.44
Uttar magura, Community clinic	1.12	1.17	1.69	1.04	1.36
Berbaradi, Community clinic	1.27	1.45	1.0	1.42	1.52
Purba, Abdalpur, Community clinic	1.07	1.68	1.14	1.06	1.47
Padmanagar, Community clinic	1.12	1.75	1.2	1.14	1.02
Char Raghunathpur, Community clinic	1.07	1.25	1.07	1.01	1.11
Hatosh Haripur, Community clinic	1.11	1.75	1.02	1.13	1.87
Kantinagar Boaldah, Community clinic	2.32	1.63	1.0	2.23	1.24
Saldah, Community clinic	1.000	1.98	1.0	1.00	1.74
Khajanagar, Community clinic	1.2	1.52	1.08	1.67	1.25
Vadalia, Community clinic	6.39	1.25	1.24	1.42	1.58
Astanagar, Community clinic	4.25	1.47	1.27	1.23	1.78
Majpara, Community clinic	1.25	1.72	1.02	1.11	1.54
Balipara ,Community clinic	3.58	1.20	1.08	1.55	1.47
Kanchanpur, Community clinic	4.25	1.71	1.47	1.74	1.22
Arpara, Community clinic	3.98	2.14	1.32	1.12	1.74
Hatibhanga ,Community clinic	2.47	2.21	1.28	1.10	1.00

Monitoring patient happiness and other metrics over time may yield valuable information for health care providers. The Malmquist index is a method for measuring the efficacy of hospitals over time. It may be used to track efficiency changes over time, including gains and losses. The Malmquist index of total factor productivity change (TFPCH) between periods t and t+1 consists of two components: technical efficiency change (EFFCH) and technological progress (TECHCH). The difference in technical efficiency between these two points in time (t and t+1) is a measure of the efficiency gain or loss caused by technological development. As it retreats, it signifies a fall in technological efficiency. The efficiency frontier varies as technology evolves to adhere to new norms, and its retreat indicates a decline in technical efficiency. Any variable with a value greater than one reflects productivity increase. By comparing EFFCH with TECHCH, we may identify the primary reasons for productivity increases or losses. EFFCH > TECHCH demonstrates that technological efficacy is enhancing production. If EFFCH is less than TECHCH, then technology has improved. Modifications to technical efficiency (EFFCH) are comprised of two subsets: pure efficiency (PECH) and scale efficiency (SECH) (SECH). When PECH > SECH, scale improvements account for the

majority of technical efficiency, but when PECH > SECH, pure technical efficiency accounts for the majority of technical efficiency.

Table 4 displays the Malmquist index (MI) findings of total factor productivity shift. The table indicates that the average yearly change in total factor productivity was 1.85. TFPCH is larger than 1, hence it may be inferred that all facilities increased their output in 2099–2022 on average.

Except for Piarpur, Community clinic, all CCs displayed both technical efficiency improvement and technological development, as reported in Table 5 of the Malmquist index summary.

Overall Discussion

This study conducted in Kushtia Bangladesh to evaluate the technical effectiveness of CCs using the DEA method. One of the twenty-four tested facilities fitted the input-oriented CRS assumption and was identified as a CC. The Saldah, Community clinic is the most efficient CC. All facilities received an efficiency rating of 58% on average. Studies conducted in Kenya revealed comparable levels of efficiency, with basic care institutions reporting 58% efficiency. Other CCs scored below the mean, with one receiving a score as low as 13%. Overall performance evaluations range from 0.10 to 1.00. This illustrates that the distribution of resources among CCs differs substantially. Low-scoring CCs need fewer inputs to produce the same outputs as they do currently. According to the research, the same quantity of inputs might provide much larger facility outputs. In contrast, the CCs are not doing as well as they could be. China's rural township hospitals have an average technical efficiency of 50%, according to a recent study. 2024; Cheng et al. The average technical efficiency score for government hospitals, particularly those servicing the general population, is between 70% and 80%, according to studies. Christian and Simon (2013); Akazili et al. (2008); Zere et al. (2006); Osei et al. (2005); Christian and Simon (2013); Akazili et al. Poor efficiency meant that less-than-ideal facilities wasted resources by generating less returns per unit of input than better-constructed facilities. The low rating for the research's efficiency reveals disparities in CC efficiency levels, indicating resource waste. The average cost per cubic meter of rubbish was TK 0.14 billion. While Hatibhanga, Community clinic had the most input slack, Padmanagar, Community clinic had the highest output slack. If all resources are used properly, healthcare facilities will operate efficiently and with minimal waste. Using slack analysis, we were able to determine how much additional output or input inefficient CCs would need to become efficient. There is ample space for inefficient CCs to increase their outputs or decrease their inputs. Malmquist Index is a time series assessment of the DMU's dynamic effectiveness. During both 2019-2022 production grew. According to enhancements in facility output, 15 CCs have benefited from both new technologies and enhanced technical efficacy. This CC group asserts that the efficiency border has shifted and the efficiency gap is closing. The health sector-wide plan enabled improvements in the accessibility of critical staff and operational equipment, which resulted in a huge increase in outpatient visits to publicly sponsored healthcare institutions between 1997 and 2011. (Karar et al., 2024). These findings revealed a rise in demand, which may have led to a rise in output as a whole.

Conclusions

By examining the magnitudes of efficiency, we may be able to determine how the sector may make the most of the resources it has been provided. At poorly functioning CCs, resources are not utilized optimally. It costs money for the healthcare industry to discard goods. The findings revealed that the least efficient CCs had an average efficiency score of 58%. The lesser-quality CCs should be improved. If we can boost productivity, we can reduce expenses and make more efficient use of our resources. Policymakers can utilize the results of efficiency estimates to identify inefficient facilities and implement reforms to increase their productivity. The results indicate that CCs may save a substantial amount of money by improving their operational efficiency.

Policymakers may find statistics on slacks and efficiency metrics valuable. Health authorities may find it useful to understand more about the technical efficiency of CCs and the variables that influence it. This might help them make better judgments and increase the technological efficiency of the CCs. If gaps exist, poor CCs may be able to increase productivity by reducing expenses and boosting production. Campaigns can increase demand, leading to an increase in output. If they increased the care and professionalism of their employees, more individuals could be interested in utilizing their services. CCs who do poorly may be able to instruct those who perform better. It is essential to assess ineffective CCs to see why they are not functioning as intended. A few things cannot be mentioned regarding the study's results. The DEA's results were founded on the premise that all inputs are utilized, and this should be emphasized first. Second, the tool requires a large number of DMUs to provide a decent output, however many facilities could not be added due to cost. Due of this, the program provides relative scores rather than absolute ones. In the study, just the most vital information was utilized. The third criterion for measuring efficiency is whether or not all resources are utilized effectively and the end product is satisfactory. The importance of quality-adjusted production in the healthcare industry is not included while assessing efficiency. In the health care sector, outcomes are impossible without increased output. However, there are still areas that require more investigation, especially since these issues must be resolved before the tools can be utilized effectively.

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Conceptual Paper

Making Animals Visible in Sustainability Accounting with Critical Look at Financial Valuation

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Abstract

Although human rights have widely been addressed in scientific communities, animal rights and relevant challenges have mainly been neglected. Despite all unfortunate accidents that happen to animals, their unfavorable status has rarely been discussed in the literature on sustainable development or sustainability accounting. Nevertheless, the economic analysis of nature inhabitants and animals is an approach that has gained in popularity in accounting, finance, and economics over the recent years. This study promotes the notion that not only does the foregoing approach fail to result in environmental monitoring, but it also allows people to have economic reasons to justify destroying nature and harming animals. This study aims to offer a strategy to make animals visible in sustainability accounting by emphasizing the avoidance of materialism and financial valuation of natural inhabitants and phenomena. This study utilizes a comprehensive literature review and critical analysis of relevant sources to develop a scientific argument that contributes to the ongoing discourse in the field of sustainability accounting. This study proposes to separate animals and emphasize their importance in the sustainability model. It also suggests avoiding exaggerations in financial and economic valuation and focusing on the environment, animals, and other elements of nature. The proposed solution is expected to be a critical approach that can underlie further discussions and analyses.

Keywords: Animal Rights, Environmental Accounting, Sustainability Accounting.

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Introduction

The concept of development in the mid-twentieth century was primarily focused on economic growth, as measured by GDP. However, after the emergence of socialism in the 1960s, there was a growing emphasis on addressing the basic needs of the population, particularly the poor. This trend was further accelerated by the devastating effects of poverty and environmental destruction, leading to the idea of sustainable development (Nastaran, Ghasemi, & Hadizadeh, 2013). Sustainable development is based on the principles of environmental protection, human rights, and economic and social development, all of which are interdependent (Eftekhar Jahromi, 2009). Although human rights are well-established in legal contexts, the issue of animal rights has not received equal attention. The question of whether animals can experience pain and suffering has led to different approaches, with some denying animal rights completely and others granting them equal status with human rights (Shahbazi, 2011). Animals on Earth have suffered cruelty at the hands of humans for domestication, clothing, and other needs (Harari, 2011; Allievi, Vinnari, & Luukkanen, 2015). While some argue that mainly domestic and certain wild animals are affected, human manipulation and destruction of nature have impacted all creatures (Longcore and Rich, 2004).

Despite all the foregoing incidents, harsh conditions of animals have rarely been discussed in the literature on sustainable development or sustainability accounting. According to Vinnari and Vinnari (2022), human perception and imagination of other inhabitants on Earth would account for the philosophical and fundamental reasons for the current situation. Animals, plants, bacteria, microorganisms, canals, and atmosphere are all considered an integrated and unified collection called the environment or nature. This classification can be observed in the conventional view of sustainable development with three eccentric circles (*i.e.*, community, economy, and environment) and introduction of a new scientific research branch named environmental and social responsibility accounting. This is also true about the concentric model of sustainable development where economy is only a subsystem of the community, both of which (*i.e.*, economy and community) are considered dependent sectors of the environment. Regardless of the fact that which sustainability model is taken into account (*i.e.*, the eccentric three-circle model or the concentric three-circle model), this ontological approach is problematic because it degrades domestic animals to an existential purgatory between society and environment, whereas it classifies wild animals as lifeless things such as stones and rivers. As a result, domestic animals are considered a sector of the economic system or a cause of environmental problems, whereas the only reason for paying attention to wild animals is to reduce the species existing in nature. This view ignores the existence of animals and excludes them from the perspective of sustainable development and thus sustainability accounting (Vinnari & Vinnari, 2022).

Paying logically special attention to domestic and wild animals would mitigate the instrumental view of these inhabitants. Although it is apparently impossible to achieve ideal conditions in which these inhabitants are not harmed, it is hoped that new dimensions are considered by legislators, environmental activists, industrial pioneers, and members of society. An economic look at animals and inhabitants of nature is an approach that has become popular in accounting, finance, and economics in recent years.

Nonetheless, this study promotes the notion that the foregoing approach will not only fail to result in environmental monitoring but also allow people to use economic arguments to justify destroying nature and harming animals.

This study was mainly inspired by the theoretical framework proposed by Vinnari and Vinnari (2022). Their framework is analyzed critically to introduce and discuss an adjustment approach. Hence, this study aims to offer a solution to inclusion of animals in sustainability accounting by emphasizing the avoidance of materialism and financial valuation of phenomena and inhabitants in nature. The proposed critical approach can underlie further discussions and analyses.

Research Method

This conceptual research used a literature review and critical analysis to find a solution for including animals in sustainability accounting. Relevant sources were identified through a systematic search of academic journals, books, and reports and evaluated for relevance and quality. The conceptual context was developed through a process of conceptualization that involved identifying key concepts and relationships from the literature and drawing on relevant theories, followed by critical discussion and analysis.

Literature Review

Protecting Animals; Iranian History

Apparently, the causes of current environmental crises should be searched in the attitudes that humans have adopted towards nature and material world or as it is now considered the environment. Nature is the most important environmental variable that has affected human life since the dawn of history. Therefore, its effective role in human evolution has always been considered and analyzed deeply by different scientists. Humans have long been exploring nature as an instrument to better know the Creator. Since the elements of pristine nature are divine creations and signs, they more eternal and inclusive than whatever humans create. In fact, communities have been searching for secrets hidden in nature and their relationships in order to conquer natural forces that are sometimes dominant. Many forms of human arts are the direct confrontations with the evils that emerge in human bodies as a result of mental and physical diseases. Asking help from natural forces, humans have been trying to expel evils from their spirits, bodies, and homes (Poorjafar & Mohandespoor, 2005).

According to ancient Iranian beliefs, the world has a spirit or a soul, some parts of which are even considered holy due to their important effects on the survival of human life. Apparently, such an approach provides other inhabitants with a kind of right to both protect their lives and have comfort. In this view, humans are not considered the center of the universe for whom everything has been created; hence, they are not entitled the right to make any interferences and interventions. As a result, more opportunities are provided to protect the environment (Orojnia & Hooshangi, 2017).

In ancient Iranian beliefs, respect for nature does not mean regarding natural elements and phenomena as gods. In other words, it means valuing, respecting, and complying with

the phenomena that affect life. Through admiration, humans remember the rights that these elements have in life and survival of the world. More importantly, this admiration is also considered worshiping the Almighty God. In this belief, every human being is responsible for improving the world, *i.e.*, improving its peace and happiness, as God wishes. Any attempts at prosperity of the world by planting a tree, flowing water, watering plants, and taking care of animals can be considered a kind of honesty and fight with evils and lies. At the same time, prosperity of the world also means protecting it against any forms of pollution, as the creatures of God are all clean and pure. Hence, they should be protected against the forces of evil that try to destroy the world and pollute the creatures of God (see Orojnia & Hooshangi, 2017). Therefore, in ancient Iranian beliefs, attempts at preserving nature can be considered major goals and responsibilities. This emphasis on prosperity of the world by taking care of water, plants, and animals will lead to environmental protection. Since everyone was responsible for helping the world reach prosperity and happiness in ancient Iranian beliefs, killing sheep or calves and even cutting down trees would be considered heinous sins. Basically, any useful plants or animals should be assisted in perfection, for they will manage to participate in the fight with evil forces. Through growth, plants and animals can then help the survival and prosperity of the world. Thus, it is important to consider mental health and physical health of all land animals, sea animals, birds, and grazers. In this regard, the ancient culture admires the shepherds that help the cattle find mates and protect them from harsh weather conditions, thieves, wolves, and evil people. At the same time, if somebody refuses to provide warm settlement or good food for even stray dogs, he/she has committed a great sin. Therefore, people are responsible for protecting sick animals, even dogs, as they protect decent individuals. In conclusion, respecting animals has a long history in the Iranian culture, something which has now been regarded and emphasized worldwide.

Animal Rights; Viewpoints

Undoubtedly, major challenges to the global village in the third millennium include destruction, pollution, and annihilation of environments for plants, animals, and humans. These challenges are caused by the actions of some humans, who have disrupted the order of nature so badly that they would not seem to need water, air, soil, plants, and animals anymore. It goes without saying that nature and environment do no need the presence or help of humans for survival, whereas humans always need nature. Hence, all animals definitely desire the extinction of the human race, for humans are the sole reason for the extinction of all species of plants and animals by forcing the wild life into its extinction stage (Movassaghi, 2022). There is a long history of numerous studies and reviews about the role of nature (including plants and animals) in society. They have indicated many conflicts and confrontations. According to many classical scientists, the modern society has a dichotomous relationship with nature (including plants and animals). In fact, although this society entitles itself to exploit plants and animals, it recognizes no considerable rights for them. Moreover, a challenging topic is to comply with the rights of animals and consider their rights to live. In this regard, the theory of animal citizenship was introduced as "Zoopolis" by Donaldson and Kymlicka (2011). According to this theory, citizens in democratic countries have three basic rights: (1) the right to live in a country; (2) the right to have benefits and welfare included in political contracts and agreements; and (3) the right to participate in democratic institutions. An important aspect of this theory is to explain different states of citizenship in western democratic societies.

Firstly, citizens are the ones who have all or most of citizenship rights. Secondly, holders of permanent residency are the ones who have the legal right to live in a country but lack the right to vote. Furthermore, holders of temporary residency have the right to live in a country within a limited period of time. In some cases, they even have the right to use hygienic facilities in some countries. Finally, there are foreign workers who either have or lack the legal documents. Then there are refugees and other cases.

Donaldson and Kymlicka (2011) classified animals as three ethical categories and suggested that they should be given political rights based on their relationships with humans. Domestic animals live among humans because they have been nurtured to depend on humans for food and shelter. Hence, these animals can be considered fellow citizens of humans whose benefits should be taken seriously in the situations that affect their lives. Their benefits should also be considered in political decisions. The wild animals who live outside human societies and do not depend on humans for survival can be compared with the citizens of foreign countries. In fact, they are the independent inhabitants whose lives should not be violated by humans. The third category includes the animals that stand between the two foregoing categories. Instances are foxes, squirrels, and mice. Since these animals live among humans and depend only indirectly on humans (*e.g.*, through leftovers), they can be considered the permanent residents without citizenship.

According to Hall (2018), the theoretical analyses presented by Donaldson and Kymlicka (2011) are very useful in two respects, the first of which is their emphasis on different types of relationships between humans and animals (including domestic, domesticated, liminal, and wild). By doing so, they corrected the conventional simple classification of animals as domestic and wild categories. Second, they introduced a new topic in different kinds of human–animal symbiosis by simulating various types of citizenship and relevant rights. By doing so, they implied that it would be essential to identify new strategies for fairly treating a wide variety of animals. For instance, fair treatment of animals should not necessarily be based on membership in a specific animal species. The members of a species can have different relationships with humans. For example, cats can be feral or domestic, and dogs can be companions or seeing eyes. There are different advantages and responsibilities considered for domestic animals. Feral dogs should mainly communicate with other feral dogs; however, companion dogs need to communicate with humans and other symbiotic species in order to partake in a society of humans and animals.

Hall (2018) emphasized ethical commitment by changing approaches from political sciences to social sciences. In this concept, commitment is defined and performed with respect to natural relationships of humans, and then legal contracts such as citizenship rights will follow and reflect those relationships. According to Hall, ethical commitments can be considered social constructs formed on the basis of social relationships over the course of history. As these relationships emerged throughout history, ethical commitments were formed. Different types of these historical commitments that have been defined and accepted include commitment to family (*e.g.*, parental support for children), commitment to society (*e.g.*, educating children and abiding by laws), an employer's commitment to employees (*e.g.*, controlling health and safety in a workplace), professional commitments (by doctors, lawyers, and auditors), a person's commitment to

his/her country (*e.g.*, paying tax and doing military service), and commitment to humanity (*e.g.*, philanthropy).

Therefore, some commitments have been defined in the human life with respect to social relationships of humans. There are also certain commitments based on the social relationships between humans and animals. These relationships can be observed in the lives of domestic animals, which are adopted and taken care of by humans. Many of these domestic animals cannot survive in nature on their own; therefore, humans look after them, something which leads to a kind of commitment. However, many animal rights activists believe that it is wrong to define a right to the ownership of domestic animals, for they have consciousness and feelings. However, according to the conventional definition of ownership, animals are undeniably classified either as conscious or other categories, the ownerships of which can be defined. In practice, pets have certain rights based on the commitments of their owners. Moreover, the relationships between humans and domesticated animals have been formed over many years based on an ethical commitment. In other words, domesticated animals meet the needs of humans. In return, humans take care of these animals. There are also lower levels of commitment to liminal and wild animals that can be defined more accurately. Hence, according to the redefinition and revision of social relationships between humans and various groups of animals, ethical commitments will then be defined for these animals.

The theory of animal rights by Donaldson and Kymlicka (2011) raised many discussions and arguments between researchers. It has been criticized differently in recent years. According to conventional anthropology, although humans share special aspects of nature (*e.g.*, desire for food, lust, and ignorance of deep feelings), they have a unique characteristic that animals lack. It is the ability to "think logically, control emotional impulses, and take ethical and behavioral considerations based on principles". In fact, these characteristics control and harness the features of the first category, *i.e.*, our animal instincts.

According to the conventional view, it is possible to dominate animals extrinsically. However, they cannot control themselves due to lacking a rational contemplation capacity and an ethical agency. Since politics is nothing but the gathering of individuals with self-control and self-rule, animals should be excluded from politics. More importantly, humans must also ignore and control their animal instincts in order to enter the realm of civic politics. In conclusion, although Donaldson and Kymlicka's theory (2011) introduced new views and pathways to researchers and scientists, it needed some considerations for theorization and application, which were taken as much as possible by summarizing Hall's theory (2018).

Sustainability Patterns

As discussed earlier, a major problem is now to regulate the relationships of development with capitals and natural resources. Nature provides the necessary energy and resources for production, consumption, and acquisition of advantages. It also frees humans from the unpleasant outcomes of growing pollution by absorbing and refining or storing pollutions and waste. According to the idea of growth limitations (Meadows, Meadows, Randers, & Behrens, 1972), the existing economic development process leads

to pervasive deviation and obstruction. Hence, "sustainability" is now a word or a concept that is always used along with "development" to strike a balance between socioeconomic and environmental goals (Hediger, 2000).

The most widely used definition of sustainability from the Brundtland Report, used by many governments, organizations, and researchers, states that sustainable development is development that meets the needs of current generations without compromising the ability of future generations to meet their needs (Brundtland, 1987). Sustainability issues and challenges are directly related to some of the capitals that cover specific economic, environmental and social issues. To ensure resilient business models, some companies are changing the way they think about products, technologies, processes, and business models. To achieve this, organizations must consider the impacts of their economic activities-purchased goods, investments made, waste, and pollution-on the natural and human resources on which they depend to avoid irreparable damage to the productive capacity of those resources. In practice, this means that organizations must consider the impact of their economic decisions on the natural environment, economic development, and the social conditions in which people live and work (IFAC, 2015).

Economists have increasingly paid attention to the bilateral effects of natural capacities in the environment and the economic development process. Therefore, nature is now considered a kind of capital along with the other kinds. With the passage of time, researchers have tried to expand the concept of sustainability and use it for policymaking. They introduced two competing views known as "weak" sustainability and "strong" sustainability. In simple terms, some scientists believe that different types of capital can be replaced and regard the sustainability of total capitals as the goal of sustainable development (*i.e.*, weak sustainability). In this view, sustainability depends on the survival and stability of the total capital value. According to this theory, the very weak form of which is known as the sustainability of Solow who is a well-known theorist of economic development, the general production capacity should only remain constant over time in a way that the per capita consumption does not decrease over time (Solow, 1986). Despite the previous adjustments, weak sustainability deals generally with the sustainability of the total economic capital. In other words, the proponents of this theory believe that different types of capital can replace one another (Caviglia-Harris, Chambers, & Kahn, 2009). They also believe that the weak sustainability condition will be met if physical capital or technological capital increases when an ecosystem is destroyed. As a result of weak sustainability, it will be possible to maintain the consumption level (and usefulness) over time. In weak sustainability, neither nature nor other types of capital have inherent values. They are only considered the tools for reaching the highest level of possible usefulness. Other scientists believe that not only the total capitals but also the accumulated natural capital—regardless of other types of capital—should merely be stable over time (*i.e.*, strong sustainability). In this view, the substitution degrees of other kinds of capital, instead of natural capital, are considered very low and near zero. This approach can be defined as the stability of natural capital over time. In strong sustainability, nature and economy are considered two complementary sectors that should both remain simultaneously stable. Undoubtedly, adopting either of these two views will have various political outcomes in production, society, and environment (see Sharzei & Mohaghegh, 2012).

Animals in Sustainability

Animals are killed for most of the food we eat, whether directly by slaughtering meat or indirectly by growing crops and destroying habitats. If we do nothing, animals die too, because while nature is allowed to take its course, we are putting human-made pressure on their lives through our use of the environment - all animals do this to each other, so we should not feel bad about expressing our animality. But when we decide to intentionally intervene and eradicate this species here or poison another there, we are often being extravagant. We risk tearing at wounds that ecosystems can never fully heal. Before we do anything that undermines the role of animals in the healthy ecosystem functioning, we must ask ourselves the all-important question of whether or not this will lead to renewed wildlife scarcity and slow ecosystem recovery. Naturalists, land managers, and politicians have been negligent in not asking this question, which means that our actions have often made the situation worse. We are also unique among animals in having a vendetta against other wildlife ... anything that is unusual, abundant, or annoying to us can become the target of our hatred. This resentment clouds our judgment, especially when, in most cases, the preservation of animal populations is of overriding benefit to us. When we lose respect for animals, we have also lost respect for ourselves. This is not just a whimsical issue, but has serious existential significance because we are killing wildlife on a scale never before seen in the history of our planet (see Mustoe, 2021).

In classical theories and studies, various philosophers always focused on humans. Although their reason was mentioned to be the fact that humans have spirits, use languages, and have free will, all philosophers highlighted thinking and rationality unanimously. The outcome of these considerations led to a view called speciesism, which indicates that a specific species of living creature is dominant and superior to other species due to having specific privileges and characteristics. Hence, humans are considered distinct from and better than animals due to having rationality and thinking capacity. As a result, all ethical considerations are focused on humans. Called anthropocentrism and known as the dominant theory in the realm of classical ethics, this view has had substantial effects on most schools of thought (Behnammanesh & Omani Samani, 2012). In different fields of philosophy, researchers explore ethical, political, and legal dimensions of social status of animals, whereas sociologists have tried to explain animals as social players (Vinnari & Vinnari, 2021).

Regarding sustainability, a brief review of the literature leads to two key insights. Firstly, according to Carter and Charles (2018), inattention to animals in the processing of society means denying the animalistic nature of humans. Although the remaining uncertainties about the common origins of humans with other species and creatures were resolved when Darwin's *On the Origin of Species* was published in 1859, it is apparently difficult for many to cast aside the notion that says humans are exceptional. In other words, any definitions of sustainability should clearly express the fact that homo sapiens account for only one species among others. Intentionally or unintentionally, this topic has so far been ignored in sustainability discussions; hence, its clarification will definitely make a serious change. Secondly, a world is emerging in scientific assumptions, political meetings, and courts everywhere to show that animals should have at least feelings in addition to ethical, political, and legal rights. Therefore, classifying and accounting

animals as "environment" or "nature" would appear to start an anachronism. It is thus essential to classify animals as a specific circle or dimension in the definition of sustainability. In this regard, Vinnari and Vinnari (2022) revised all weak and strong views of sustainability. They adjusted the weak sustainability view consisting of three separate connected circles (*i.e.*, economics, environment, and society) to a model based on four connected circles (*i.e.*, economics, environment, society, and animal welfare). They also adjusted the strong sustainability model consisting of three concentric circles (*i.e.*, economy, society, and environment from small to large) to four concentric circles (*i.e.*, economy, humans, animals, and environment from small to large). It can be argued that the animals added to these models were excluded from both environment and society. In a common model, animals can be defined both as part of society and as part of environment, for animals are included in the environment when they are considered wild, whereas they are included in society when they are considered domestic. These concepts were covered earlier in previous sections. According to Vinnari and Vinnari (2022), adding animals to this model can improve attention to animals and better compliance with their rights. The conventional view of humans and environment is a human-based view that infers all phenomena to meet the human needs. However, according to modern views, all creatures have their own needs, right to life, and right to welfare. This is the kind of view that helps us reason that a sustainability model, whether in a weak or a strong form, will become more complete if animals are included (by separating animals from other dimensions). Although the strong view of sustainability is not human-based and is thus philosophically closer to the goals of the present study, it does not still appear a complete and modern model if animals are ignored. Given their cultural, economic, and geographical conditions, different countries have considered various conditions for animals ranging from the minimum rights to the maximum rights. Although laws and regulations have not addressed this topic directly, different countries have paid different levels of customary and legal attention to the problem. In fact, animals should not be regarded only as objects used by humans, a notion which differentiates the laws of some countries about animals from those of other countries that adopt conventional views.

Accounting and Sustainability

The idea of accounting and sustainability have a long history with now well-defined definitions, while sustainability accounting is not yet clearly delineated and individualized. To date, there is no universally accepted definition of sustainability accounting, but views on its classification and mandatory components are slowly converging (Gacser & Szoka, 2021).

Norway was one of the first European countries to produce an environmental account. Norwegian officials were concerned that their natural resources, on which their economy was relatively dependent compared to other European countries, might run out. They therefore developed accounts to track the use of their natural resources. In the 1980s, they developed accounts for air pollutant emissions that were closely related to energy accounts. The Netherlands was also a leader in the development and adoption of environmental accounting. They developed and attempted to introduce a measure of sustainable national income that takes into account the degradation and depletion of environmental assets as a result of economic activities. This method adopted in many

other European countries and integrated into the environmental accounting procedures developed under the auspices of UN.

The third country that used environmental accounting was France. The system used by France was an integrated system built on three separate but interrelated units. First, natural, cultural, and historical resources were to be measured physically. Second, places were to be organized into geographic accounts that contained physical data on assets based on geographic, ecological, and landscape characteristics. Third, people and institutions should be described in both physical and monetary terms in agent accounts that should be linked to data on how and where each agent used resources (Hecht, 2007). Repetto, Magrath, Wells, Beer, & Rossini (1989) argued that there is a dangerous asymmetry between the way we measure the value of natural resources and the way we think about them. The dual approach to natural resources and other visible assets creates a false and inaccurate dichotomy between the economy and the environment, which ultimately leads policy makers to destroy or ignore the environment under the title and propaganda of economic development. They believed that the increase in agricultural production in the Indonesian highlands was achieved almost entirely at the expense of potential future production. Only when the basic measures of economic performance, as codified in the official national accounting framework, be reconciled with a valid definition of income can economic policy be influenced toward sustainability. They confirmed that Indonesian growth rates would have been significantly lower with adjusted GDP than in conventional accounts.

The ideas derived from the knowledge and the economics of sustainable development were the main source of environmental accounting in the early 1990s. This provided favorable conditions for the testing and emergence of new literature (Gray & Laughlin, 2012; Bebbington & Larrinaga, 2014). The second half of the 1990s was the period of maturation of environmental accounting. Environmental information was taken into account, and environmental auditing was introduced. In addition, environmental accounting was discussed and implemented theoretically and practically in various countries, especially in industrialized countries. This course has been called the cornerstone of environmental accounting because it represented the beginning of the growth of research in environmental accounting. The number of researches related to environmental accounting increased significantly during this period, and environmental reports became accessible to researchers. Standards for environmental management, environmental auditing, and environmental inspection were also developed. In addition, guidelines for environmental reporting and accounting have been published since 2010 to date. The quantity and quality of articles on environmental accounting are also increasing and have led to significant successes and knowledge gains (refer to Vasile & Man, 2012; Hussain, Halim & Bhuiyan, 2016).

According to a recent research (Gil-Marin et.al., 2022), the concept of sustainability accounting includes the operations of companies taking into account economic, environmental and social factors, the disclosure of results in the form of sustainability reports, the provision of adequate information on the company's sustainability performance to society and the communication process of the company's impact to internal and external users through financial and non-financial reporting. This concept establishes the responsibility of companies to provide shareholders with financial and

non-financial information on the impacts of their non-financial activities, including information related to energy use efficiency, waste management, wastewater, chemical and metal waste, occupational health and safety, talent training, social and voluntary activities, supply chain, and quality control (Gimenez, Sierra & Rodon, 2012; Cantele, Tsalis & Nikolaou, 2018; Geerts & Dooms, 2020).

Sustainability is a dynamic factor that changes rapidly and has many different characteristics that cannot be easily measured and quantified. For valuation professionals, this means that they need to deepen their knowledge of strategies to evaluate the relationships between sustainability and market value in a favorable way. Currently, financial valuers are at risk of misinterpreting strategies and making inappropriate adjustments or comparisons due to insufficient knowledge and limited skills in assessing sustainability (Warren-Myers, 2012).

Results; Rejecting Financial Valuation for Animals

This study addressed accounting and inclusion of animals. Despite considering the presentation of a useful framework for reporting and auditing animals, this study does not consider their valuation to be useful and does not propose anything in this regard because of the errors that applying financial values to inhabitants of nature will cause. According to the literature on the financial and economic valuation of nature, there is always a difference between instrumental value and intrinsic (inherent) value.

Instrumental values represent the value of ecosystems as mere means to an end and are often measured in monetary terms. In contrast, intrinsic values refer to the value of ecosystems as ends in themselves and are often presented as moral duties (Arias-Arévalo, Gómez-Baggethun, Martín-López, & Pérez-Rincón, 2018).

Therefore, the inherent value cannot be evaluated financially. When the financial valuation of nature is discussed, the intrinsic aspect of its value is neglected, and the instrumental aspect of its value is used. In other words, the financial valuation of nature makes people think that the value of nature is only instrumental. As a result, people will not have any perception of the fact that nature has a value beyond its economic services. Hence, allocating a number can have dangerous effects because it prevents people from knowing the intrinsic value and keeps them away from the intrinsic value.

In recent years, especially the past four decades, there have been considerable developments in the approaches and methods for financial and economic valuation of the environment. In fact, the accuracy and efficiency of valuations are now more than ever before, although some of their limitations still persist. According to environmental reports (*e.g.*, *Forest Europe*, 2017), these limitations include mutual reliance or dependence of environmental phenomena and their services on each other. This also includes dependence inside an environmental phenomenon as the reaction of its various components to provide a specific service or dependence of different environmental phenomena for providing a specific service. Therefore, it can be argued that the financial or economic valuation of each service in nature may depend on its relationship with other services of nature. As a result, it is probably impossible to consider the effects of other

services in the economic and financial valuation of a natural phenomenon. This limitation is very important, leading to slight and inadmissible valuation.

Another major aspect is inattention to minor and marginal changes in providing services of environmental phenomena. Moreover, in the financial and economic valuation process, no sufficient attention is paid to the fact that some environmental services are not complementary (but can replace each other), and exploiting one of them will prevent using the other. Hence, additional enumeration is an important topic in valuation. It causes excessive valuation of some environmental services and inattention to the value of other services, something which will be so important and effective. In addition, the geographical effectiveness of an environmental phenomenon can be emphasized. Valuation should consider the entire population and geography affected by an environmental phenomenon. Different phenomena can have very different capacities for servicing humans. It is essential to perceive whether a specific service of an environmental phenomenon is local, regional, national, or global for proper estimation in valuation. Failure to properly perceive the depths and dimensions of services provided by environmental phenomenon will lead to insufficient and unbelievable valuations, something which has happened in some cases of environmental and even historical and cultural phenomena.

Furthermore, the effects of human activities and decisions on environmental phenomena and their services may last for a long time. Hence, an appropriate degradation rate is employed to evaluate costs and benefits. In fact, all costs and benefits are converted into the current value for comparison and analysis. Nevertheless, selecting a degradation rate usually requires many hypotheses. A popular solution is to use different degradation rates, which are usually downward, for various years because uncertainty increases in the long time. However, selecting a degradation rate can cause a considerable difference in the final result of a cost-benefit analysis. In developing countries, socioeconomic conditions are very unpredictable in the long run, thereby making calculations face serious errors and inadmissible results. At the same time, the services that environmental phenomena provide depend not only on their scales and performance but also greatly on their conditions and levels of biological variety. The worse the conditions of an environmental phenomenon, the fewest the services. In many cases, there might be a series of gradual conditions with no substantial differences at different times. However, threshold conditions sometimes appear. In fact, a turning point emerges in the destruction of environment in threshold conditions. From that point onward, there will be irreversible changes in that environmental phenomenon which will lead to the permanent loss of relevant services or complete destruction in other words. The concept of uncertainty should also be included in specialized scientific communities with regard to the services of environmental phenomena. Scientists have always discussed what services are provided by various environmental phenomena, how they may change over time, and what quantity and quality they will have. There is still no consensus about these matters. For this purpose, a proposed solution includes conducting a sensitivity analysis, identifying uncertainties, and testing the sensitivity of evaluation results to changes in values or assumptions. However, given the high sensitivity of the problem and considerable differences in evaluation results, it is nearly impossible to obtain a unique result. In addition, there are restrictions on the access to primary data and information. In this regard, a proposed solution is to use data and results of similar studies, something

which will be challenging due to practical differences in many cases. Therefore, environmental valuation is a developing project with considerable restrictions. It can be practical and useful in some cases; however, this does not mean the positive outcome of benefits and costs of using his valuation method.

Despite the key role of valuation in decision-making and improving the efficiency of decisions, it cannot completely indicate the intrinsic value of nature and natural phenomena. Hence, if we try to evaluate and valuate domestic animals (*i.e.*, the animals that are kept at farms or homes) and wild animals (*i.e.*, the animals that live in nature and are not nurtured by humans) in the most accurate and comprehensive way (even by considering the forthcoming developments in valuation), we will merely face nothing but materialistic confusion. This point of view makes everything quantitative and material. It will finally quantify the values of human lives. Probably, experts and philosophers in accounting, finance, and economics will somehow support this point of view due to their professions and perspectives. However, the real values of many assets including the human capitals of companies and communities depend on spiritual and abstract aspects, in which humans have not believed truly and have been interested recently. This is a warning which will lead to a dangerous outcome if it is not dealt with quickly.

Discussion and Conclusion

In today's world, many wild animals are killed or trapped by humans every year. The trapped animals are mainly used for entertainment at homes, zoos, and circuses or utilized as research tools to discover new drugs for humans. There are various motivations for hunting wild animals such as using elephant tusks, alligator skins, and rhino horns. In fact, animals have been killed many times to maintain comfort in human life environments. Iran is among the countries with numerous environmental problems, especially animal rights, such as the acts of killing dogs by Municipalities of Tehran[2], Tabriz[3], and Damavand[4] in addition to the acts of killing donkeys in the margins of Tehran[5], torturing horses at Hakim Abad Zoo in Mashhad[6], killing chickens by Municipality of Ilam[7], killing a large number of one-day-old chickens at poultry farms[8], and killing pregnant livestock at slaughterhouses[9]. There are no clearly explained principles for evaluating and reporting the foregoing cases. Accountants can powerfully enter these cases and be in charge of reporting and auditing. In addition to their positive achievements for society, based on previous studies (*e.g.*, Tavakolnia, & Tirgari, 2015; Tavakolnia, & Makrani, 2015; Tavakolnia, 2017), they can also create a novel work atmosphere for accounting and auditing.

This study was first inspired by the problems raised by Vinnari and Vinnari (2022). In other words, animals are mainly intangible in contemporary communities because a

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[2] https://www.khabaronline.ir

[3] https://www.imna.ir

[4] https://www.didarnews.ir

[5] https://donya-e-eqtesad.com

[6] https://hakimemehr.ir

[7] https://www.farsnews.ir

[8] https://www.yjc.news

[9] https://www.iribnews.ir

problematic ontology has suspended domestic animals between society and nature and classified wild animals with lifeless inhabitants and habitats. The study then explained how the current notion in sociology and philosophy would lead to a view regarding animals as individuals with ethical, political, and legal rights. In fact, animal rights are about to be fulfilled. After the strong view of sustainability was revised, animals were defined as the individuals settled in a natural environment, and humans were defined as a subcategory of animals. However, reiterating the classification of humans as a subcategory of animals may make readers misinterpret that humans should be considered a species of animals. This interpretation is not correct. The fundamental motivation for this classification is to clarify the hierarchy in which we are all considered subcategories of the environment. However, humans and animals were also considered relatives. The problems of financial and economic valuation of nature inhabitants including animals were then addressed.

The incompatibility raised in this study (*i.e.*, the separation of animals in the sustainability development in addition to avoiding valuation in sustainability accounting, especially with regard to animals) can be discussed in future critical studies. On the one hand, animals accounting can be considered a benevolent attempt at recognizing benefits of animals as a starting point to develop accounting systems and accountability. On the other hand, it can be considered an act of violence which can subject animals to dangerous outcomes of accounting such as monetization, equalization (to other assets), and marketization if it is recognized and implemented completely. This problem also exists in topics of accounting natural capital and human capital. Moreover, there is a fundamental criticism in a wide variety of studies. Accordingly, the mechanisms that seek to solve environmental problems by creating financial values for nature will actually encourage an instrumental view of nature and diminish people's relationships with nature and their responsibility for environmental protection. In other words, such mechanisms persist an economic worldview in which people are considered separate from nature.

Academic research has shown a growing interest in valuing the environment, resulting in various models and methods being proposed (*e.g.*, Cuckston, 2018). However, academicians frequently argue that environmental valuation and accounting will reduce nature to only its monetary value, leading to the degradation of nature's inherent beauty and value (Hines, 1991). This movement may also lead society to view nature as valuable only for its financial worth (*e.g.*, Hrasky & Jones, 2016), which can lead to the destruction of the environment under the guise of economic justification (*e.g.*, Sullivan & Hannis, 2017). Hence, there has been a fundamental criticism in a wide range of literature to show that such mechanisms underlie an economic view that separates people from nature and its inhabitants.

As a result, they cannot be useful strategies to help the environment and living creatures. Although it appears that financial and economic valuation of natural phenomena is a novel up-to-date process, taking an economic look at natural phenomena and comparing the outcomes with those of other alternative activities (*e.g.*, agriculture and factory construction) resulted in the current situation (especially, in developing countries). Hence, the current process of accounting and financial and economic valuation of nature and natural phenomena will be the more extensive, more calculating, and more devastating reimplementation of the conventional but false view that jeopardized the

environment and living creatures. Thus, in addition to separating animals and emphasizing their importance in the sustainability model, this study proposes avoiding financial and economic valuation and taking a look at the environment, animals, and other pillars of nature.

Moreover, there are growing problems with the implementation of financial and economic valuation of the environment and its inhabitants in developing countries that have lower levels of achievements in economic and cultural areas of the environment. In these countries, many decision-makers and legislators now lack a correct perception of the environment and do not give much importance to the environment in their decisions. Their top priorities include employment, income creation, and satisfaction of people's daily needs. Developing financial and economic valuation in such conditions can provide such decision-makers and legislators with a tool to use figures and statistics to justify destroying the environment, something which has already been happening. This problem might be less prevalent in developed countries; however, according to the existing evidence, it has been witnessed with a higher incidence rate in underdeveloped and developing countries. For instance, according to a recent report, an authority for the environment in Iran justified destroying a plain in the north of Iran with the purpose of constructing a petrochemical factory by comparing the financial value and earnings of petrochemical activities.

Recommendations

This study emphasized the idea of separating animals in the sustainability model. It is not a novel idea; however, this study proposed performing separation with the avoidance of monetization and materialism. It is hoped that researchers pay attention to this idea and expand it in future studies. It is also hoped that the arguments presented in this study are sufficiently persuasive with respect to the fact that regarding animals as a sector of the environment would lack conceptual cohesion. At the same time, animals cannot be converted into monetary figures and numbers, and neither can plants, plains, mountains, and seas. However, a holistic conclusion in this regard needs further analysis and exchange of opinions, something which naturally requires the consideration of a series of scientific, empirical, and rational factors. Future studies can also analyze accounting to determine what changes will occur by expanding the scope of accounting to animals and avoiding quantification and monetization of accounting and reporting in this area. Generally, it is important to predict in which direction accounting will progress.

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