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## WORK, INDUSTRIAL & ORGANISATIONAL PSYCHOLOGY | RESEARCH ARTICLE

# Examining Islamic piety at workplace via an artificial neural network

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**Abstract:** The purpose of the study is to investigate a hybrid model of Islamic piety, by merging exploratory factor analysis (EFA) and an artificial neural network (ANN). The present research was divided into three phases. The first phase applied the Delphi method to identify the dimensions of Islamic piety. In the second, the dimensions established using the Delphi method were used in exploratory factor analysis (EFA) to uncover the underlying structure of Islamic Piety construct. In the last phase, an artificial neural network (ANN) was used to rank the factors discovered to establish their significance. The EFA results offers a new model of Islamic Piety comprising of five factors: Rituals, Belief, integrity, love of family and justice. An ANN model was formed and enhanced using the determination of model variables. The results revealed that the main variables in the Islamic piety are Rituals, integrity, belief, love of family and justice. The implication of this study is useful for educational, academic, organizational management including leadership, training and human development, and policy making initiatives. Management can use the model developed to satisfy the needs of their employees and hence enhance to increase the productivity. This study is one of the pioneering studies in the field of Islamic management and the first to employ ANN. The results of the present research affirm that Islamic Piety is one of the key fundamentals of Islamic faith.

**Subjects:** Multidisciplinary Psychology; Neuropsychology; Cognitive Psychology; Economic Psychology; Educational Psychology; Behavioral Neuroscience; Business, Management and Accounting; Cultural Studies;

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### PUBLIC INTEREST STATEMENT

This is one of the pioneering studies in the area of Islamic management and the first to employ Artificial Neural Network. Islamic piety is one of the central tenets of Islamic faith. It incorporates two main aspects, Islamic spirituality and Islamic social responsibility. The two subconstructs of Islamic spirituality that are “rituals and belief”, and three subconstructs of Islamic social responsibility namely “integrity, love of family and justice” describe Islamic piety in the given Turkish context. Interestingly, by concentrating on these dimensions, more ethical conduct among employees in the workplace can be accomplished, which can control much of the undesirable behavior of employees. In addition, this present model of Islamic piety can bring about a more prosperous and progressive workplace.

**Keywords: Islamic Piety; Islamic Spirituality; Islamic Social Responsibility; Hybrid Model; Artificial Neural Network**

## 1. Introduction

Over the last few decades, workplace spirituality has been one of the most debated themes of business literature. The significance of the construct and its relationship with the organizational, leadership, and management outcomes has been greatly emphasized in various settings: academic circles, mass media, websites, social groups, and even newsletters (Long and Mills, 2010). The seminal work of Krishnakumar and Neck (2002) managed to outline a direction and structure to this emerging field and demonstrated the importance of understanding the role of religion and workplace spirituality in business. As a result, workplace spirituality has gained a considerable amount of attention of scholars from diverse disciplines including philosophy, psychology, theology, sociology, sociology of religion, and business management (e.g., Bhattacharya, 2013; Choudhury, 2018; Grant et al., 2004; Hall & Edwards, 2002; Krishnakumar & Neck, 2002). The same passion and commitment have also been displayed by the corporate sector. As demonstrated by business organizations increasingly arranging activities (such as symposiums, workshops, trainings, cultural change, and organizational transformation projects, etc.) to harness the soul and minds of employees to achieve competitive advantage (Case & Gosling, 2010; Fontaine & Ahmad, 2013).

Despite the increasing interest in workplace spirituality, there still seems a lack of agreement on the meaning of workplace spirituality (Garcia-Zamor, 2003; Tourish & Tourish, 2010). Certainly, for systematic and scientific inquiries of any construct one requires a clear definition and a generally agreeable means to measure it. Hence, it is deemed that the current literature still faces a significant challenge to not only define workplace spirituality but also to conceptualize the same (Bhatti Omar et al., 2016; Fry, 2003; Gupta et al., 2014; Klenke, 2003; Mitroff & Denton, 1999). Interestingly, in the absence of a valid, reliable, and widely acceptable scale, it is quite challenging and difficult to empirically examine the theoretical propositions presented in previous studies. Equally, the notion of generalizability also becomes a key concern for several investigators when it comes to examining the relationship between workplace spirituality and other outcome variables (Benefiel et al., 2014; Jurkiewicz & Giacalone, 2019; Shrestha, 2016). Nevertheless, the efforts made so far in extending the existing body of literature on workplace spirituality are indeed commendable.

With the constantly changing business environment, organizations are searching for greater meaning and purpose. This realization as discussed earlier has led several business leaders and scholars to recognize the significance of bringing religiosity and faith back to the business realm (Benefiel et al., 2014; Garg, 2017; Hill et al., 2013; Jurkiewicz & Giacalone, 2019; Kouzes & Posner, 2002). Over the same course of time, several investigations have been conducted in assessing workplace spirituality from different religious convictions like Christianity, Confucianism, Hinduism, Jainism, Judaism, Shinto, Sikhism, and so forth. Despite Islam having the second-largest religious following in the world, there is a lack of empirical studies that focus on Islamic workplace spirituality and religiosity (Abu-Raiya & Pargament, 2011; Fares & Bin Noordin, 2016).

Islam is a comprehensive religion and a complete code of life (Alkahtani, 2014; Bhatti Omar et al., 2016). As of 2010, there were nearly 1.6 billion Muslims worldwide making Islam the second-largest religion: “the major share subsists in Indonesia (13%), followed by India (11%), Pakistan (11%), Bangladesh (8%), Nigeria (5%), Egypt (5%), Iran (5%), Turkey (5%), Algeria (2%) and Morocco (2%)” (Lugo et al., 2013, p. 10). The Muslim world along with the western sphere are also experiencing the challenges of global capitalism. Predominately Islamic countries that spread from Morocco to Indonesia, over the last few years have observed a “return” to the Islamic belief, values, and traditions as a way of affirming their uniqueness and identity. The return of Islamic values aims at managing the increasing materialism, stresses, and burdens of the capitalist and globalized 21<sup>st</sup> Century (Choudhury et al., 2020). So much so that the Muslim world has

intensified their efforts to reinstitute and establish their educational, public, business, and commercial organizations in compliance with the tenets of Islam and their local culture (Azmat et al., 2020; Bhatti et al., 2020; Fontaine, 2019; Hashim, 2009). Indeed, this purpose has reinvigorated several Muslim Organizations to inculcate Islamic religiosity and spirituality in the workplace (Dusuki & Abdullah, 2007; Fontaine, 2018, 2019; Sulaiman et al., 2015).

In Islam spirituality holds great significance. It is essential to first understand Islamic Piety (Taqwa) to comprehend and acknowledge spirituality. Islamic Piety, defined as consciousness of God, is one of the most significant attributes of Islam (Dusuki & Abdullah, 2007). Islamic Piety and its derivatives have been mentioned almost 258 times in the Quran. The magnificence of Islamic Piety is that it not only comprises of Islamic spirituality but also Islamic social responsibility (Jariko et al., 2016; Khodayari-fard et al., 2008). Recently, the Islamic Piety construct has been incorporated in the field of business and management. The multi-dimensional construct has likewise been tested with few output variables. However, as any other construct, the scale established for measuring Islamic Piety still requires further assessment and analysis. In effect, further examination is required to confirm its soundness and generalizability amongst the Muslim world (M. H. Kamil, 2011; Mohsen, 2007). Hence the present study aims to investigate a hybrid model of Islamic piety, by merging exploratory factor analysis (EFA) and an artificial neural network (ANN).

## 2. Background

### 2.1. Islamic piety

The intent and meaning of life for a Muslim believer is found in Islamic Piety. Living a life of Islamic Piety fundamentally means being a true friend (servant) to Allah (SWT) and possessing a heart that can understand and recognize the innermost depth of Divine blessings (Al-Ghazali, 1993). Truly, Islamic piety means to abide by Allah's (SWT) commands and remain away from all that has been disallowed in order to seek eternal blessing and avoid punishment in the life hereafter (Beekun & Badawi, 1999; Bhatti Omar et al., 2016; Ibn Kathir, 1999; Kamil et al., 2011; Topbas, 2009). M. Kamil et al. (2010, p. 166) posited that "Islamic Piety is an essential element for the wellbeing of a believer in this life and the Hereafter. It encompasses one's perception of obligations and accountability towards Allah (SWT) that includes tasks and duties in all walkways of life, may it be family or work. And that when people possess Islamic piety, there is a high tendency that they will be honorable in their actions, both at dwelling and at the workplace". Islamic piety is as well referred to as God-consciousness. Al-Ghazali (1993) asserted that Islamic piety is often seen as a state of absolute maturity that fully synchronizes the belief, spirit, and the body of the believer. Ergo, anyone whether private or public, who follows and observes the laws of Allah (SWT) is a person of greater piety. The higher the degree of piety a believer has, the closer that individual will be to Allah (SWT).

Islamic piety is manifested in all aspects of human conduct that includes one's soul and body. In the Quran, Allah (SWT) defines Islamic piety by describing the characteristics of people who possess piety as Allah (SWT) states: "*This is the Book; in it is guidance sure, without doubt, to those who fear Allah. Who believe in the Unseen, are steadfast in prayer, and spend out of what We have provided for them. And who believe in the Revelation sent to thee, and sent before thy time, and (in their hearts) have the assurance of the Hereafter*" (Quran, 2: 1–4). Evidently, love and fear of Allah (SWT), humbleness, and thankfulness are key facets of Islamic piety. Nevertheless, offering prayers, performing Hajj, fasting, and giving charity makes a believer more disciplined, ethical, self-satisfied, patient, and spiritually motivated (Shomali, 2010; Kamil, 2011; Mohsen, 2007; Saleem, 2009).

In Islamic standpoint, one can achieve true peace, tranquility of mind and body by obedience and submission to Allah (SWT) (Sheikh & Bhatti, 2017). An individual's relationship with *The Creator* (Allah SWT) should, by right, regulate the mode of association with corresponding servants of God (Ahmad, 2003; Hasan, 2002). This theoretical basis allows Muslims to avoid

competing interests and leads to a society in which everyone has the unanimity of his/her own purpose in life (Ahmad, 2003). This also contributes to a harmonious culture whereby everyone endeavors to collaborate rather than compete with one another. Additionally, channeled through the association with Allah (SWT), the person's everyday activities, commercial transactions and interactions would be encouraged by the principles of firmness, truthfulness, respecting the law, fairness, sympathy, forbearance, ostentation, tolerance and uprightness, instead of deceit, greediness, haughtiness, jealousy, backbiting, class consciousness, revenge, possessiveness, envy, and self-aggrandizement (Hasan, 2002; Seligman, 2002; Seligman & Royzman, 2003).

Nevertheless, in an organizational context it is generally deemed that Islamic piety inspires a believer towards improving work quality, excellence, brilliance, self-discipline, and organizational development (Bhatti Omar et al., 2016). When adequately focused, it could be easily realized that Islamic piety comprises of two fundamental components namely, "Islamic Spirituality" and "Islamic Social Responsibility" (Jariko et al., 2016; Khodayari-fard et al., 2008; Mohsen, 2007; Ramli & Osman-Gani, 2011).

#### 2.1.1. *Islamic spirituality (IS)*

"O you who believe! Fear God, and be with those who are true in word and deeds" (Quran 9:119); "Say: He is Allah the One and Only; Allah, the Eternal, Absolute; He begetteth not, nor is He begotten; and there is none like unto Him" (Quran 112: 1-4).

The spiritual dimension of human nature is essential to mankind's wellbeing, as it is through spirituality that human beings can develop and grow (Al-Ammar, 2008). Nottingham (1993) advocates that one of the most important ways to study human behavior is through spirituality, as it balances the overall individual's personality. And that individual behavior is composed of three factors: spiritual, physical, and psychological. These factors continuously interact with one another and if one of these factors becomes unstable, one may view problems in general human nature.

"In Arabic the word spirituality is described as "*rawahaniyah*". It is stemmed from the phrase "*ruh*" which implies "spirit" (Achour et al., 2016). Islamic Spirituality alludes to belief, deeds and actions that are in accordance with the overall Islamic principles and values (Bhatti Omar et al., 2016). Spirituality is rooted in the faith of the believer and is displayed in all their activities for the achievement of glory, compassion, support and forgiveness of Allah (SWT). A believer who submits him/herself to Allah (SWT) is in a state of absolute worship, hence strengthening him/her spiritually (Saleem, 2009). Mohsen (2007, p. 55) maintains that "spirituality is a critical part of human nature" for living a steady, balanced, and a satisfied life. The beauty of Islamic spirituality is that it brings believers close to Allah (SWT) and also contributes to making them valuable members of society (Hawa, 2004).

Spirituality, moreover, adds strength, conviction, and self-confidence to a believer, hence, encouraging them to showcase the best of their abilities, attitude, and behavior (Mohsen, 2007). Spiritually strong individuals are likely, to be honest, loyal, hardworking, principled and more efficient for the reason that they take work as a form of worship (Bhatti Omar et al., 2016; Kamil et al., 2011; Sulaiman et al., 2015). Also, they are likely to be more devoted, keen, and committed to achieving excellence (Sulaiman et al., 2013). Islam ascribes great significance to spirituality as it can offer some meaningful answers to a number of organizational inquiries (Mohsen, 2007; Fry et al., 2005; Mat & Naser, 2012; Bhatti Omar et al., 2016). As stated earlier, Islamic spirituality has been incorporated in the field of business and management. The multi-dimensional construct has likewise been tested with few organizational output variables like; organizational effectiveness, efficiency, sustainability, economic growth/performance and so forth (Grine et al., 2015; Rulindo & Mardhatillah, 2011). Table 1 further elaborates on a variety of spirituality studies detailing as how Islamic spirituality encourages employee attitudes and behaviors that contribute to organizational success and concomitant financial benefits.

**Table 1. Studies on Islamic spirituality**

<b>Authors (Year)</b>	<b>Region</b>	<b>Methodology</b>	<b>Findings</b>
Adawiyah Wiwiek and Pramuka Bambang (2017)	Indonesia	Quantitative	Islamic workplace spirituality in the Indonesian organizational context is explained by 13 indicators.
Grine et al. (2015)	Malaysia	Qualitative	Spirituality plays a significant part in the success of Muslim female entrepreneurs.
Toor (2008)	Malaysia	Conceptual	A comprehensive Islamic leadership model based upon the teaching of the Qur'an and Sunnah.
Dasti and Sitwat (2014)	Pakistan	Quantitative	A multidimensional Islamic spirituality measure has eight factors namely: Self-Discipline, Feeling of Connectedness with Allah (SWT), Quest and Search for Divinity, Meanness-Generosity, Anger, and Expansive Behavior, Self-Aggrandizement, Islamic Practices, and Tolerance-Intolerance.
Sani and Ekowati (2019)	Indonesia	Quantitative	In a moderated mediated relationship: Islamic spirituality and organizational citizenship behavior from the Islamic perspective (OCBIP) relationship is moderated by spirituality at work and organizational commitment. Furthermore, OCBIP influence employee performance.
Bhatti Omar et al. (2016)	Pakistan	Quantitative	Islamic spirituality and Islamic social responsibility, reduce workplace deviance.

(Continued)

**Table 1. (Continued)**

<b>Authors (Year)</b>	<b>Region</b>	<b>Methodology</b>	<b>Findings</b>
Karakas et al. (2015)	Turkey	Qualitative	Collective spirituality and Turkish Islamic business ethics have six themes namely: Flying with both wings, treating people as whole persons, upholding ethics of compassion, striving to transcend egos, being devoted to each other, and leaving a legacy for future generations. In particular collective spirituality has, three themes namely, Transcendence, connectedness, and moral excellence. Furthermore, these themes shape organizational values.
Fatin Husna and Mohd Fuaad (2017)	Malaysia	Conceptual	<i>Tawhid</i> paradigm provides a connection between Islamic work ethics and Islamic spirituality. Specifically, knowledge (Ilm), integrity (al-Ihsan), and true conviction (al-iman). Islamic work ethics relate to the goodness (al-ma'aruf). Islamic spirituality relates to Tawhid (al-nafs). Furthermore, ethics enhance service quality, client loyalty, profit, and empowerment, and Islamic spirituality enhance employee performance, motivation, loyalty, social duty, positive energy, and self-realization.
Fares and Bin Noordin (2016)	Malaysia	Conceptual	Conceptually Islamic spirituality enhances employees' organizational commitment, business functioning, and organizational citizenship behaviors.

(Continued)

<b>Authors (Year)</b>	<b>Region</b>	<b>Methodology</b>	<b>Findings</b>
Tayebiniya and Khorasgani (2018)	Iran	Quantitative	Workplace spirituality and its dimensions, namely: meaningful work, a sense of connectedness, and positive social relations with coworkers, and employee's alignment with organizational values predict employees' job performance.
Adamu et al. (2011)	Malaysia	Conceptual	Islamic spirituality provides entrepreneurial motivation, execution, and commitment to social responsibility.
Zandi et al. (2015)	Malaysia	Quantitative	Islamic spirituality's belief dimension enhances business leadership effectiveness.
Kurt et al. (2020)	Turkey	Quantitative	Islamic spiritual values and Religion helps in creating business links/ networks. Moreover, souls who treat this as an extension of spiritual practice get intangible network benefits. Whereas, individual who uses religion as an entry point to networks gets both tangible and intangible network benefits.
Mohd Zain et al. (2014)	Malaysia	Qualitative	Islamic spiritual practices promote entrepreneurs' motivation to build confidence and perseverance. Furthermore, upholding moral principles smoothen the management of the business which eventually leads to business performance.
Kamil et al. (2015)	Malaysia	Quantitative	Islamic social responsibility (ISR) positively influences organizational citizenship behavior from an Islamic perspective (OCBIP). Whereas, Islamic spirituality does not.

(Continued)

**Table 1. (Continued)**

<b>Authors (Year)</b>	<b>Region</b>	<b>Methodology</b>	<b>Findings</b>
Bello (2015)	Nigeria	Conceptual	Spiritual and material demands of human beings are fully executed in the Islamic economic system. As the Islamic economic system allows individuals the freedom of self-interest during market competition without compromising social interest and accountability in the Hereafter. Based upon the concepts of Iman (inner consciousness), Khilafah (vicegerency of Allah) and al- <i>akhirah</i> (Hereafter).
Zandi et al. (2017)	Malaysia	Quantitative	Islamic spirituality and Islamic social responsibility positively influence continuance organizational commitment.
Rashid, Manzoor, and Ghani (2019)	Pakistan	Qualitative	Employees define workplace spirituality in terms of religious belief. Furthermore, this is also a source of inner peace and happiness by serving humanity and religion/ Islam.
Tyas et al. (2019)	Indonesia	Qualitative	Organizations that inculcate Islamic spirituality in organizational values, their employees' show positive behaviors.
Faseruk and Hossain (2017)	Canada	Conceptual	Islam encompasses a socio-economic system where morals and ethics are inextricably connected to achieve a balance between materialistic and spiritual aspects of this worldly life. Furthermore, spirituality in management is influenced by and reflected in the Islamic faith.
Azhar and Farooq (2017)	Pakistan	Quantitative	A leader's Islamic spirituality and Islamic social responsibility positively impact employee work engagement.

(Continued)



Authors (Year)	Region	Methodology	Findings
Fanggidae et al. (2020)	Indonesia	Quantitative	Workplace spirituality based on Islamic work ethics positively influences employee performance.

(Source: Authors Computation)

### 2.1.2. Islamic social responsibility (ISR)

Mohsen (2007) affirms that Islamic social responsibility is a primary responsibility of a believer towards oneself, people and nature as a whole. “Islamic social responsibility is defined as actions and behaviors that a believer espouses in daily life which results in respect, harmony, justice, integrity and development of people and society with the realization of achieving the forgiveness and pleasure of Allah (SWT)” (Bhatti, 2015 p. 96). Topbas (2009) explains that Allah (SWT) has set precise guidelines and responsibilities for believers that he/she must perform with oneself and others. In Quran Allah (SWT) states: “ ... .And fulfil the covenant; verily the covenant shall be asked about” (Quran 17:34); “Fulfil the covenant of Allah when ye have entered into it, and break not your oaths after ye have confirmed them; indeed ye have made Allah your surety; for Allah know eth all that ye do” (Quran 16:91). Allah (SWT) also says: “Woe to those that deal in fraud. Those who, when they have to receive by measure from men, exact full measure, but when they have to give by measure or weight to men, give less than due. Do they not think that they will be called to account? On a Mighty Day, A Day when (all) mankind will stand before the Lord of the Worlds?” (Quran 83:1–6).

In the organizational context, Islamic social responsibility exhibit respect for others, personal and societal duties that can play the social hopes and potentials of an organization’s role (Haniffa, 2002). Islamic social responsibility stresses on minority interest, employees, societal justice and is also concerned with problems related to the progress of the humanity (Ullmann, 1985). Employee well-being is increased by following social values of tolerance and uprightness, truthfulness, forbearance, firmness, fairness and equality, respect for the law, kindness, instead of deceit, haughtiness, ostentation, class consciousness, insubordination, backbiting, envy, jealousy and self-aggrandizement (Hasan, 2002). Individual with high social responsibility has a great deal of potential for success and high achievement (Wentzel, 1991), social responsibility refers to code of human behavior that guide actions in various situations, defining right and wrong acts. Islamic guidance, with its commitment to justice, integrity, truthfulness, patience, helping others carry an equilibrium between the rights of every individual and duties as well as responsibilities towards others (Parvez, 2007). This delivers a robust and self-propelling drive for just and good conduct, without negating the natural dispositions for personal gain (Dusuki, 2008) and hence benefits the organization at large and the individual employees.

### 3. Data collection and research method

The present research was divided into three phases. The first phase applied the Delphi method to identify the dimensions of Islamic piety. In the second, the dimensions established using the Delphi method were used in exploratory factor analysis (EFA) to uncover the underlying structure of the Islamic Piety construct. In the last phase, an artificial neural network (ANN) was used to rank the factors discovered to establish their significance. The scale for measuring Islamic Piety was adapted from Mohsen (2007) which comprises 53 items which include 18 items (*Cronbach’s Alpha 0.89*) measuring Islamic Spirituality, whereas 35 items measured (*Cronbach’s Alpha 0.88*) Islamic Social Responsibility. To estimate the necessary sample size, the researchers followed Hair

et al.'s (2014) advice that affirms that factor analysis minimum sample size must be at least five times the number of reflections to be examined. Hence, for the present research “the acceptable sample size had a 5:1 ratio” that is a sample size of  $53 \times 5 = 265$ . Notably, data was collected through questionnaires using a convenient sampling technique. The target population for this research was the managerial level employees working in the Banking sector in Turkey. This setting was chosen as it furnishes a strong concentration of literate workers (especially English literate) who can fill out the questionnaires with ease. The population setting was performed by cross verifying the list of “Bank Association of Turkey”. To get the maximum responses the researchers distributed 1100 questionnaires. The questionnaires distributed were in English Language, hence, a total of 736 questionnaires were received. Further, based on the detailed evaluation all illegal, illogical, inconsistent and incomplete questionnaires were removed as advised by Hair et al. (2014). In total only 500 responses were useable for analysis.

Questionnaires were screened manually for missing values or inappropriate values before initiation of data analysis. The distribution of the frequency of the demographic variables of the respondent in the study is exhibited in Table 2. The sample has a clear distinction in terms of the

**Table 2. Distribution of respondents as per sample characteristics**

Characteristics		N	%
Gender	Male	354	70.8
	Female	146	29.2
Age	20–24	44	8.8
	25–29	220	44.0
	30–34	130	26.0
	35–39	63	12.6
	40 and above	43	8.6
Marital status	Married	256	51.2
	Unmarried	244	48.8
Qualification	Intermediate	7	1.4
	Bachelors	121	24.2
	Master	299	59.8
	Professional Certification	73	14.6
Job designation	Support Staff	166	33.2
	Line Manager	274	54.8
	Middle Manager	55	11.0
	Top management	5	1.0
Experience in current position	Less than 1 year	152	30.4
	1–5 Years	300	60.0
	6–9 Years	39	7.8
	≥10	9	1.8
Work experience in general	<1 year	71	14.2
	2–5 Years	229	45.8
	≥6 years	200	40.0
Number of employees in the company	1–10	105	21.0
	11–20	242	48.4
	≥21	153	30.6

gender of the respondents, with a majority of respondents being male, 70.8%, compared to 29.2% being female respondents. The age spectrum of the sample varied with 44% of respondents aged between the 25–29, 26% between the ages of 30–34, 12.6% between the ages of 35–39, 8.8% between the ages of 20–24 and 8.6% aged 40 and above. 51.2% of the respondents were married and 48.8% unmarried. The sample was well educated as expected with 59.8% of respondents having a master's degree, 24.2% holding a bachelor's degree, and 14.6% having a degree with professional certification while 1.4% have intermediate certificates. The sample's job category breakdown consists of 54.8% line managers, 33.2% support staff, 11% middle managers, and 1% top managers. The breakdown of the number of years of experience in the present position consists of 60% between 1 to 5 years, 30.4% less than 1 year, 7.8% between 6 to 9 years, and 1.8% equal to or greater than 10 years. The breakdown for the total work experience in general consists of 45.8% between 2 to 5 years, 40% equal to or greater than 6 years, 14.2% less than 1 year. The breakdown of the number of employees in the company (bank branch) consists of 48.4% between 11 to 20 employees in the company, 30.6% equal to or greater than 20 employees in the company, 21% between 1 to 10 employees in the company. Notably, all the respondents were Muslims in this study. [Table 2](#) below presents the distribution of respondents per sample characteristics.

## 4. Results

### 4.1. Delphi method

In the initial stage, the Delphi method has been applied. This is a widely accepted method of consensus building among experts regarding a special theme or topic (Hsu & Sandford, 2007; Keeney et al., 2006; Sobhanifard, 2018). The Delphi method has been established by the RAND Corporation in the 1950s and 1960s, with vital efforts placed by Dalkey (1967, 1969) and Dalkey and Helmer (1963). This particular survey tool is employed in organizing and structuring group views, opinions, and discussions. The Delphi method initiates a discourse on a specific subject and then compiles the perspectives of a devoted group. Based on the following, decisions are made in the wake of the views at the group level (Hasson et al., 2000; Sobhanifard, 2018). In general, this specific method entails two or more phases in which respondents can give their opinions through a questionnaire. In simple terms, this framework can allow a group to come together on an agreement with a “predefined criterion” (Rowe & Wright, 1999; Sobhanifard, 2018).

As this is one of the initial studies to be acquitted in Turkey, in the first round 30 academic and religious scholars were approached to explain and rationalize Islamic Piety. The respondents were asked to justify Islamic Piety and what sub-variables constitute Islamic Piety. It is to be noted that the answers were presented based on the literature, Quran, and the Sunnah. In the second round, a seven-point scale was employed to measure the Islamic Piety and its sub-dimensions. Following this round, the questionnaire was analyzed; the less significant sub-dimensions of Islamic Piety (with average scores of less than 3) were deleted. The third-round questionnaire followed the design of the second round, which included a 7-point scale. In this round, two main dimensions i.e., Islamic Spirituality and Islamic Social responsibility, as well as fourteen sub-dimensions of Islamic Piety were endorsed.

### 4.2. Exploratory factor analysis (EFA)

The present study uses EFA which is a multivariate interdependence technique and is mainly used in survey-based studies. It has two primary objectives; firstly, to identify the least number of factors that comprise the possible amount of information included in the variables, along with the maximum possible reliability (Hair et al., 2014). The second goal is to assess how indicators are organized in factors that are not explicitly observed, signifying the dimensions of the phenomenon being analyzed or investigated (Johnson & Wichern, 2007). While continuing with the EFA, the two essential tests are “Battlett’s Test of Sphericity” and “Kaiser-Meyer-Olkin” (KMO), these tests

measure the sampling adequacy. Bartlett’s test “supplies the statistical significance that the correlation matrix has significant correlations between at least some of the variables” (Hair et al., 2014) and becomes more sensitive as the size of the sample increases. A statistically significant Bartlett test ( $p < 0.05$ ) shows that there are adequate correlations between the variables to continue with the process of analysis. While the number of cases decreases (Johnson & Wichern, 2007), this test is more reliable and robust than the KMO test. Table 3. depicts the KMO score for the current study and that is 0.938, which is an acceptable determination of sampling. Bartlett’s Test of Sphericity was significant ( $p < 0.001$ ) and supported conducting an EFA.

**Table 3. KMO and bartlett’s test**

<b>KMO and Bartlett’s Test</b>		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.938
Bartlett’s Test of Sphericity	Approx. Chi-Square	14,621.619
	Df	1378
	Sig.	.000

Table 4 shows the commonalities extraction. Principal component analysis works on the initial assumption that all variance is common; hence before extraction, the communalities are all 1. The communalities reflect the common variance in the data structure. In Table 4 communalities were examined and it was found that no item had communalities near 0, indicating that all items contributed to the EFA.

**Table 4. Commonality matrix with loadings for each of the items**

	<b>Initial</b>	<b>Extraction</b>
IS1	1	0.620
IS2	1	0.664
IS3	1	0.631
IS5	1	0.570
IS6	1	0.636
IS8	1	0.676
IS9	1	0.557
IS12	1	0.533
IS13	1	0.553
IS14	1	0.537
IS15	1	0.616
IS17	1	0.594
IS18	1	0.552
ISR7	1	0.627
ISR12	1	0.668
ISR13	1	0.630
ISR14	1	0.650
ISR15	1	0.709

(Continued)

	Initial	Extraction
ISR16	1	0.779
ISR17	1	0.753
ISR18	1	0.752
ISR19	1	0.730
ISR20	1	0.559
ISR21	1	0.720
ISR22	1	0.615
ISR31	1	0.629
ISR32	1	0.584

Extraction Method: Principal Component Analysis.

The factor structure was examined, 2 Factors were extracted from IS and 3 Factors were extracted from ISR shown in Table 5, 13 variables of Islamic spirituality and 14 variables of ISR were finalized. Discussing the EFA outputs, overall, five factors were run for EFA indices. One EFA factor was generated for each subfactor which means that factor one is truly representing the overall variance of each variable. Moreover, 2 EFA factors were generated for a major factor of Islamic spirituality and 3 EFA factors were generated for a major factor of Islamic social responsibility.

**Table 5. Rotated component matrix**

Items	Spirituality	Islamic Social Responsibility			
	Rituals	Belief	Integrity	Love of family	Justice
IS2	0.812				
IS3	0.792				
IS1	0.787				
IS15	0.778				
IS17	0.765				
IS13	0.744				
IS12	0.724				
IS18	0.722				
IS14	0.694				
IS8		0.815			
IS6		0.797			
IS9		0.746			
IS5		0.705			
ISR16			0.881		
ISR18			0.864		
ISR17			0.863		
ISR19			0.853		
ISR14			0.802		
ISR7			0.788		

(Continued)

**Table 5. (Continued)**

Items	Spirituality	Islamic Social Responsibility			
	Rituals	Belief	Integrity	Love of family	Justice
ISR20			0.744		
ISR15				0.829	
ISR12				0.791	
ISR32				0.748	
ISR31				0.742	
ISR21					0.785
ISR22					0.771
ISR13					0.769

#### 4.3. ANN modelling for variable ranking

A neural network is a complete analytical data modeling/mining tool used in technical applications that involve predictions and classifications. Artificial neural networks are primarily used due to its power, flexibility, and ease of use. Artificial neural networks are analytical models appropriate for problems that are too complex to be modeled and solved by traditional mathematics and usual procedures (Sobhanifard, 2018; Sobhanifard & Sadatfarizani, 2018). Neural networks are capable of modeling input-output functional connections. An ANN comprises of input variables, which shall be classified by their characteristics. In the study, we employed an ANN using SPSS software for ranking the dimensions of Islamic piety. The ANN modeling for variable ranking was performed with 2 inputs representing rituals and belief as sub-factors of Islamic spirituality and 3 inputs representing integrity, love of family, and justice of Islamic social responsibility was added as an independent variable (see Figure 1). While Islamic piety was treated as output (dependent) variable using an ANN model.

In this study, a neural network is established with the Multilayer Perceptron (MLP) algorithm using SPSS. The case processing summary as showcased in Table 6 affirms that 355 cases were assigned to the training sample, 145 to the testing sample. No cases were rejected/excluded from the analysis

Table 7 displays the network information. The input layer is the covariates such as rituals, belief, integrity, love of family, and justice. The number of units excluding the bias unit is 5. In rescale methods for covariates are standardized. The number of hidden layers is 1 and the number of units in the hidden layers is 3. The activation function is based on a hyperbolic tangent with a dependent variable: Islamic Piety. The output layer is with 1 unit based on a standardized method of rescaling scale dependents. The activation function is identity and the error function is the sum of squares.

In the present case, SPSS has produced a network diagram exemplified in Figure 2. At this point, “synaptic weight” implies the strength or amplitude of a connection between two nodes. The diagram indicates the 5 input nodes, the 3 hidden nodes, and the 1 output node symbolizing Islamic Piety.

Table 8 highlights the overall information regarding the results of training and applying the MLP network to the holdout sample. The sum of squares error is shown as the output layer and

Figure 1. Network diagram.

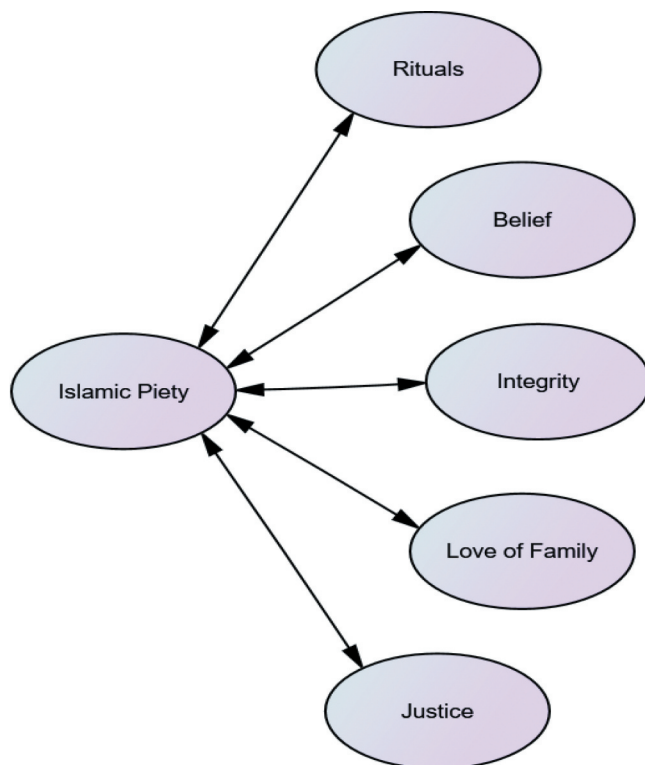


Table 6. Case process summary

		N	Percent
Sample	Training	355	71.0%
	Testing	145	29.0%
Valid		500	100.0%
Excluded		0	
Total		500	

has scale dependent variables. This in particular is the error function that the network intends to reduce and curtail during training. One successive step with no reduction in error was applied as a stopping rule. The relative error of the scale-dependent variable is the ratio of the sum of squares error for the “null” model, in which the mean value of the dependent variable is used as the predicted value for each case. The average overall relative errors are constant across the training (0.01) and the testing (0.01) sample, which presents us with the confidence that the error in future cases, scored by the network will be close to the error indicated the table presented.

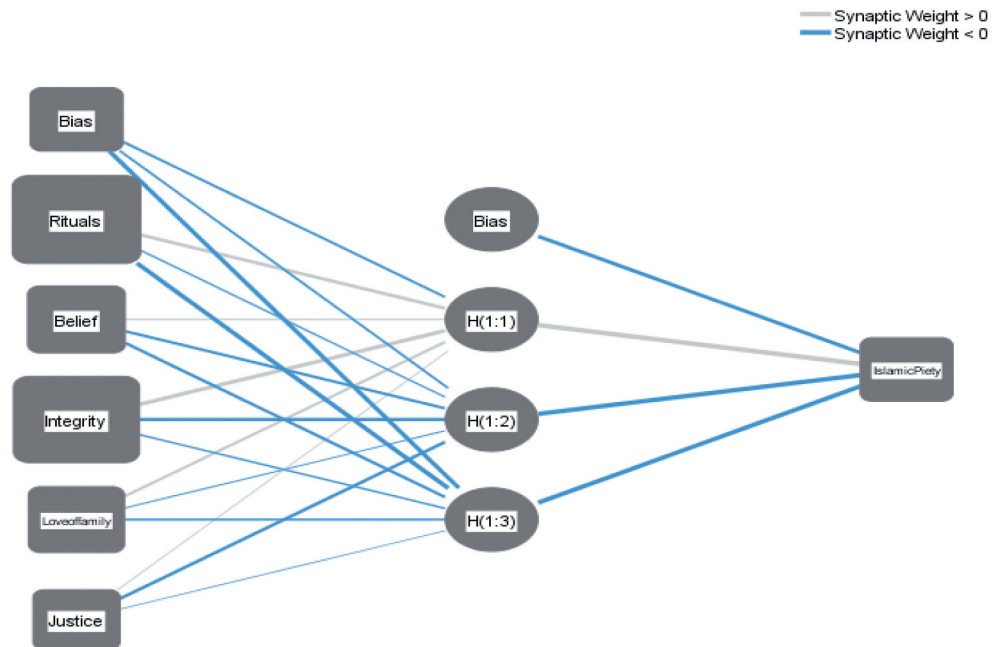
Table 9 identifies the significance of the independent variable based on the covariates with the dependent variable. In the present study, the Islamic Piety is a measure based on 2 sub-constructs of Islamic spirituality and 3 sub-constructs of Islamic social responsibility. The most dominating variable as per the results is rituals (100%), followed by integrity (97%), belief (57%), love of family (54.7) and the last influencing variable is justice (42.1%).

**Table 7. Network information**

<b>Input Layer</b>	<b>Covariates</b>	<b>1</b>	<b>Rituals</b>
		<b>2</b>	<b>Belief</b>
		<b>3</b>	<b>Integrity</b>
		<b>4</b>	<b>Love of family</b>
		<b>5</b>	<b>Justice</b>
	<b>Number of Units</b>		<b>5</b>
<b>Rescaling Method for Covariates</b>		<b>Standardized</b>	
Hidden Layer(s)	Number of Hidden Layers		1
	Number of Units in Hidden Layer 1 <sup>a</sup>		3
	Activation Function		Hyperbolic tangent
Output Layer	Dependent Variables	1	Islamic Piety
	Number of Units		1
	Rescaling Method for Scale Dependents		Standardized
	Activation Function		Identity
	Error Function		Sum of Squares

a. Excluding the bias unit

**Figure 2. Ranked effective variables of Islamic piety.**



Hidden layer activation function: Hyperbolic tangent

Output layer activation function: Identity

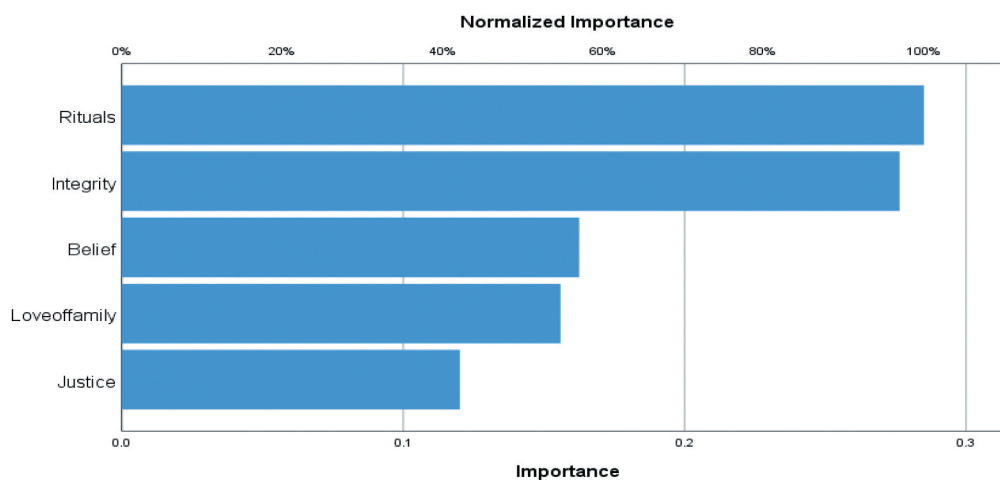


Table 8. Model summary		
Training	Sum of Squares Error	.158
	Relative Error	.001
	Stopping Rule Used	Training error ratio criterion (.001) achieved
	Training Time	0:00:00.03
Testing	Sum of Squares Error	.060
	Relative Error	.001
Dependent Variable: Islamic Piety		

Table 9. Independent Variable Importance		
	Importance	Normalized Importance
Rituals	.285	100.0%
Belief	.163	57.0%
Integrity	.276	97.0%
Love of family	.156	54.7%
Justice	.120	42.1%

Figure 3 displays the normalized importance chart of the variables that is based on the independent variable's importance.

Figure 3. Ranked effective variables of Islamic piety.



### 5. Discussion and conclusion

This study investigates a hybrid model of Islamic piety, by merging exploratory factor analysis (EFA) and an artificial neural network (ANN). Past studies in this area have certainly not employed this hybrid approach (M. H. Kamil, 2011). The dimensions for Islamic piety were extracted using the Delphi method and tested in a large sample (500 employees). The results of EFA confirm that the dimensions of Islamic piety can be explained by the model. Indeed, it can be established that the

EFA results offer a new model of Islamic Piety in the given context. It is also acknowledged that Islamic piety comprises five factors: rituals, integrity, justice, belief, and love of family. These five factors showcase a strong relationship and constitute the main construct that is Islamic piety. It can be further argued that the findings of this study give extra weight to these factors to fully grasp the construct of Islamic Piety from a Turkish perspective. An ANN model was formed and enhanced using the determination of model variables. The results revealed that the main variables in the Islamic piety are rituals, integrity, belief, love of family, and justice.

The EFA results confirmed that the Islamic piety is explained by 2 variables falling under the head of Islamic spirituality and 3 variables of Islamic social responsibility. The results of ANN modeling for variables imply that following Islamic ritual is one of the most significant sub-constructs of Islamic piety. It may be argued that in the Turkish context the primary focus or emphasis of employees/believers is on practicing rituals by which one feels nearer to the Creator. It is deemed that Rituals cleanse a person's soul and by worshiping Allah (SWT) a person proves himself as a valuable entity for the society or the organization, through his/her kind dealings with others. This leads to a reduction in stress, fear, anger, jealousy, and guilt while engendering happiness and peace (Bhatti Omar et al., 2016; Fry, 2003; Nasr, 2013; Szocik & Van Eyghen, 2021). Notably, rituals play an important role in Islam and in the life of a Muslim. An identity of a Muslim believer is primarily constructed, preserved, enforced, and maintained through observing rituals such; prayers, fasting, pilgrimage and charity. It is to be realized that "Islamic rituals have become an effective means of constructing Muslim identity through its highly embodying practices of religious values and teachings into embodied individual Muslims" (Hidayat, 2017, p. 16). Moreover, the rituals when practiced properly help in strengthening loyalty, sensitivity, and identity among Muslim believers (Mohsen, 2007; Wolterstorff, 2016). Hence, "rituals can strengthen the link or connection between oneself and Allah (SWT) which brings strong support for enjoining good and forbidding all immoralities" (N. M. Kamil, 2012, p. 111).

In the Quran, Allah (SWT) says: "*O you who believe, fear Allah, and be in the company of the honest*" (Quran, 9:119). Integrity is the second most important factor identified by this study. Mohsen (2007) advocates that one of the key traits of a true believer is his/her honesty: "A believer's honesty would be reflected in their devotion towards Allah (SWT), as well as when he/she speaks or deals with others. Moreover, devoted Muslims would not incline in any kind of cheating, misrepresenting of facts or falsifying information from others". Particularly, maintaining integrity has societal benefits, for individuals that have integrity, can build trust in professional as well as nonprofessional relations with others. Popular and well-liked authentic individuals also benefit from societal support and thus enjoy close relationships with others (Domínguez & López-Noval, 2020; Kaya et al., 2020). In Islamic Management, integrity can be attributed directly, and in parallel, to the attributes of honesty, trust, faith, and stout belief, influential and noble personality. Personal and organizational integrity lead to good and smooth relationships framed with morality and ethics (Vargas Hernandez et al., 2012).

"Belief" in the current study ranks third. Belief (*Iman* in Arabic) provides a believer with an aspiration to make their self-analysis and understand their actual role in life (Mohsen, 2007). It is this role in life that would carry on even after their death through their righteous deeds and good children (Mohsen, 2007). In the Quran, Allah says, "*Say: He is Allah, the One! Allah, the eternally Besought of all! He begetteth not nor was begotten. And there is none comparable unto Him*" (Quran, 112: 1-4). N. M. Kamil (2012, p. 110) asserts that "belief in Allah (SWT) implies a profound understanding of the unity of direction (*Tawhid*), clarity of goals, prevention of misconduct, and equality between people". Belief works as protection that restrains one from all those deeds and actions that are forbidden and lights one's mind to recognize virtue, good values, and morality (Bhatti Omar et al., 2016). In short, belief is to follow the right path that has been set by Allah (SWT) and avoid all that has been forbidden (Bhatti, 2015; M. H. Kamil, 2011). Lastly, it is to be noted that Islam teaches the value of both belief and practice and Muslims are required to put

their beliefs into practice by performing the rituals devotedly. It can therefore be inferred as to why Rituals is ranked first on the basis of the results of the ANN followed by honesty and belief.

Based on the overall results of the ANN love of family is ranked fourth. It could be argued that the love of family is the core basis of Islamic culture and the same can be observed in the Turkish context: “the harmony and confidence presented by a stable family are highly respected, valued, and seen signs for the divine and spiritual growth of all members in the society” (Bhatti, 2015, p. 108). It is relatively common in a Muslim community to find extended families who live together and providing each other with comfort and support. Islam places a premium on respect for parents. Especially, mother and father are highly honored and regarded (Bhatti Omar et al., 2016).

Justice is the fifth most significant subconstruct that forms Islamic Piety. In the Quran it is written that: “Allah commands justice, the doing of good, and liberty to kith and kin, and He forbids all shameful deeds, and injustice and rebellion: He instructs you, that ye may receive admonition” (Quran, 16:90). M. H. Kamil (2011) affirms that Muslims are repeatedly reminded in the Quran of their responsibility when carrying out trade to be honest and just, as well as being equitable and fair in the distribution of wealth in the society. It is apparent that in Islam the relationship between the employer and the worker must be developed based on justice and mutual consent to appreciate employee honor and dignity. Notably, Islam promotes compassion, love, and kindness towards one another, along with the element of civility and esteem in the conversation and discussion. Moreover, Islam inspires honesty, constructing of communal trust and confidence along with salutation and thanking people while communicating (Bhatti, 2015). In brief, this is one of the pioneering studies in the field of Islamic management and the first to employ ANN. The results of this research affirm that Islamic Piety is one of the key fundamentals of the Islamic faith. It includes two key dimensions that are Islamic spirituality and Islamic social responsibility. The findings of this study also make a new contribution to the theory, that two subconstructs of Islamic spirituality are “rituals and belief”, and three subconstructs of Islamic social responsibility namely; integrity, love of family and justice defines Islamic piety in the given Turkish context. Further, by focusing on these dimensions, one may achieve greater ethical behaviour among employees in a workplace that can regulate much undesirable behaviour of employees. Additionally, this model of Islamic piety may accomplish and engender a more productive and progressive workplace.

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