LINKING SOFTWARE ENGINEERING PARADIGMS TO ISLAMIC VALUES

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ABSTRACT

In general, Muslims all over the world have an innate tendency to hold fast to Islam's teachings as narrated in the Qur'an and Hadith. The present study is an investigation on the utilization of this adherence for improving the standards of ethical behavior of Muslim IT professionals, particularly software engineers. The principal point of this paper is to develop the importance of ethics among software engineers in order to make them realize the impact of various immoral practices in their field e.g., property violations, general software upgrading, design methodology, software privacy, etc. The moral values put forward in code-of-conduct have been scrutinized from Islamic point of view by studying the same in light of verses in the Qur'an and Hadith of our beloved Prophet Muhammad (P.B.U.H.). It is high time for software engineers and developers to accept the dire need of a paradigm shift in software engineering that integrates divine revelation with reason. The paper, therefore, has an Islamic but global approach towards software engineering paradigms.

Keywords: *Code of Ethics, Ethical Issues, Information Ethics, Islamic Ethics, Software Engineering Ethics*

1. INTRODUCTION

In today's world, computers assume a basic and important part in trade, industry, research, communication frameworks, medicine, entertainment, education and numerous different domains of our civilization. Experts and professionals who are involved towards contribution in improvement, designing, specification, analysis, maintenance, certification, study or hordes of various other uses of computer frameworks have a huge effect on our society and in this manner, there are chances towards making positive offerings to the general public, but simultaneously there is a possibility to bring about trouble. To guarantee that their endeavors will be utilized for good, software engineers must confer upon themselves to make the discipline of software engineering gainful and a profession of high regard and respect, which will promote a moral way to deal with the expert practice. Strong professional ethical issues have been underlined as emphatically proficient, by the Computing Curricula 2001, The Joint Task Force on Computing Curricula of IEEE Computer Society and Association for Computing Machinery (ACM) [1] thus making it a constituent of the main subject matter for computing [2].

Ground-breaking improvements in the mid 1940s, in the fields of science and reasoning, prompted the formation of another branch of morals that would eventually be named as "information ethics" or "computer ethics". The originator of this new field of philosophy was the American researcher Norbert Wiener, a teacher of engineering and mathematics at MIT [3]. Walter Maner characterized the planned new field as one that reviews moral issues "exasperated, changed or made by innovations in computer technology" [4]. He built up an exploratory course related to computer ethics planned fundamentally for students in university-level software engineering programs. Johnson noticed that computers put forward new forms of standard ethical issues and ethical predicaments, fueling the old issues, and driving us to apply common good standards in unknown

domains [5]. "Policy vacuum" suggested by Moor, in the late 1980s provided a clarification of the requirement for computer morals and his record of the radical "logical malleability" of technology related to computers rapidly turned out to be exceptionally compelling among a developing number of computer morals researchers [6]. In the 1990s, he included extra thoughts, including the vital idea of core human values, for example, wellbeing, joy, life, security, opportunities, resources, and learning [7].

The paper intends to present the Islamic "legal system of Shari'ah laws and ethics" and its procedure of settling moral predicaments about the field of information ethics (IE). Unlike previous approaches where only few situations have been focused upon leaving some important state of affairs with respect to software engineering, all possible situations have been analyzed in this paper giving ample evidences from Qur'an and Hadith besides offering recommendations to deal with the same.

The organization of the manuscript takes after as: Section II discusses the concept of ethics in software engineering followed by the description of Islamic ethics as mentioned in the Qur'an and Sunnah of our beloved Prophet (Peace Be Upon Him) in Section III. Section IV is dedicated to the need of Islamic values in the field of software engineering and development where some recommendations have been enlisted for software engineers and then concluding remarks have been given in Section V.

2. ETHICS IN SOFTWARE ENGINEERING

Inculcating ethical standards in engineers infers to the utilization of a (potentially but not explicitly complete) arrangement of standards which gives an introduction to the choice of the question which possesses relevance to teaching ethics in engineering and which most certainly don't. The application of the field of ethics in engineering figures out which subjects could or ought to be fused into the educational programs of engineers' ethics. Nonetheless, this field is not explicitly and purely characterized by the concerned researchers and hence is dubious. It is depicted distinctively in the different ways to deal with the issue, which go from clear examination of an engineers' relationship to ethical standards and reaches out to the treatment of regularizing propositions on how an engineer could build more reasonable, more philanthropic or more socially companionable advancements.

Inculcating morals in the process of engineering should make the future engineers ready to have the capacity to tackle such difficulties effectively. It should empower an engineer to decide whether the present substantial standardizing structure gives an adequate premise to his choice or not, and whether an ethical clash could follow. These inquiries bring up difficulties for training engineers in ethics which must be guided and bolstered by analysis that investigates and mirrors the role of ethics in engineering [8].

As recommended by some researchers, there are two subjects which can likewise be research inquiries for morals and innovation among the various distinctive ideas on the role of ethics and technology. The primary question or subject can, to some degree famously, be figured as 'to what degree do the decisions and activities of engineers have any kind of effect and whether they make any difference?' The second question or subject that is by all accounts identified with various distinctive contexts is 'how should the role and details of duty of engineers be resolved or developed and in what capacity can proclamations about the duty of engineers be legitimized?' [9]

Achievements in the development of software are mostly dependent upon the skills of the individuals included. The number of skilled developers is less compared to the amount of software to be developed. The need for engineers will keep on outstripping the supply for a long time to come. Smugness has effectively set in with a few firms recognizing that several of their engineers make no, or worse, negative contribution. A considerable number of engineers don't seem to have any concern because of which more software development will be in a state of crisis. However, it is a possibility that an endeavor to try and make software engineering a genuine engineering field can be made. There is a need to attempt and produce improved (ethical) engineers [10]. In this manner, the investigation of morals is an important constituent of the training of each software engineer.

Software engineering, in collaboration with ethics, would characterize a worthy code-of-practice. Presently, we have such codes-of-practice in medicine, architecture, law, and so forth. As a rule, they are characterized and implemented by a specific expert body. The organizations of this sort

have been set up for engineers. Nevertheless, in case of software engineers, the ethical standards are characterized by just a voluntary code of practice which is not well characterized, uncertain, inexact and not particular to issues specific to software engineering.

The ethics related to software engineering includes any choice made by a software engineer while developing, designing, maintaining and constructing the various computing objects. Figuring out how to settle on these choices is a basic part of the technical training of a software engineer.

- *Base level* - a moral duty to nominal morality.

- *Professional level* - like some other professional ethical standards need an uncommon responsibility to the general population served and influenced by the profession - a moral duty to public prosperity.

- *Engineering level* - the obligations in relation to software engineering, which are firmly identified with the state-of-the-art ethical standards: a moral duty to quality work [10].

2.1. Code of Ethics

It is suggested by the ACM/IEEE-CS Joint Task Force on Software Engineering Ethics and Professional Practices and affirmed by the ACM and the IEEE-CS that Software Engineering Code of Ethics and Professional Practice (Version 5.2) be considered as the standard for educating and rehearsing software engineering [11].

Software engineers are the individuals who provide their contribution by directly participating or by educating, to the investigation, detailing, outlining, improvement, affirmation, maintenance and testing of systems related to software. On account of the nature of their roles in creating software frameworks, software engineers have critical chances to cause damage or do good, empower others to cause damage or do good, or to impact others to cause damage or do good. To guarantee, essentially, that their endeavors be employed for good, software engineers must confer upon themselves to make software engineering a gainful and regarded profession. As per that dedication, software engineers should cling to the accompanying Code of Ethics and Professional Practice.

According to their commitment to the security, welfare and health of general society, software engineers should hold fast to the below mentioned Eight Principles:

1. PUBLIC - Software engineers should show reliability in their actions besides being in accordance with the interests of the general society.

2. CLIENT AND EMPLOYER - They should perform their duties in a way most advantageous to both customer and employer, and simultaneously in line with the interests of the general population.

3. PRODUCT - They should assure that their items and alterations related to them meet the most noteworthy and conceivable expert measures.

4. JUDGMENT - They should preserve trustworthiness and be independent in their expert judgment.

5. MANAGEMENT - Software engineering leaders and managers should adhere to and advocate a moral way of dealing with the administration of software advancement and support.

6. PROFESSION - Software engineers should boost the honesty and status of their profession in accord with the interests of the general population.

7. COLLEAGUES - Software engineers should be reasonable and helpful to their associates.

8. SELF - They should take an interest in long lasting learning with regard to their professional practice and should advocate moral ways to their professional practice.

The Code consists of eight Principles recognized with the conduct of choices made by expert software engineers, including specialists, teachers, administrators, bosses and strategy creators, and additionally trainees and understudies of the profession. These values distinguish the morally dependable connections in which associations, groups, and people participate and the crucial liabilities inside those connections. The sections of every principle are descriptions of a fraction of the commitments incorporated within these connections. These commitments are customary in the humanity of a software engineer, with exceptional care owed to individuals influenced by the job of software engineers, and the extraordinary components of the acts of software engineering [12].

2.2. Ethical Issues in Software Engineering

The principle issues which can be ascribed to morals and ethics in connection to software engineering can be identified as hacking, privacy, piracy, and ethics related to IT staff. By investigating, we start to understand that software engineering and ethics include more problems which in general are of similar seriousness. Among these, different issues are:

- Computer experts' obligations towards their managers as well as customers;

- Appropriate certification of software by developers plus designers;

- Appropriate testing of software by developers and designers;

- Handover of frameworks to customers;

- Developers and designers sending off a computer software development mid-stream;

- Offering greatest level of software security to customers;

- Software engineers having high regard for the proprietary problems in relation to the methodology, algorithms, and information;

- Working of software engineers towards precise frameworks with the purpose of providing complete integrity of data; and

- Inclusion of software engineers in developing frameworks that will aim at unethical ends [13].

3. ISLAMIC ETHICAL VALUES

Islam instructs the benefits of the dynamic procurement of new information as the Qur'an instructs man to always implore upon his Lord for an increase in knowledge. Nonetheless, this instruction does not legitimize the interest and securing of simply any sort of information without any consideration to its moral ramifications. The Prophet's notable supplication looking for God's fortification from useless knowledge helps to prompt Muslims to remember the sort of learning that should be disregarded for their prosperity. As per Islamic morals, every human ideal is accomplished accordingly of directing two outrageous propensities, to be specific, avoiding getting knowledge in order to stay in a condition of ignorance and reveling efficiently in the quest for non-beneficial knowledge with no requirement. In this way, Islamic morals of knowledge, by which the quest for science and innovation in Islam should be represented, looks to free man from these two

negative propensities. The fundamental thought discoursed in this review is the idea of beneficial knowledge with specific reference to principles of software engineering.

The guideline of Tawhid saturates the life of a Muslim and thought, both at personal and societal levels and Muslim researchers have been successful with regards to blending the requirements of religion with the necessities of engineering and innovation. They were likewise ready to seek after and approach science and innovation from a comprehensive point of view, giving due thought to every sort of advantages and convenience that may ensue from them, befitting the real needs of man as a multidimensional animal, which is generally thought to be a microcosm. It was simply because of the Shari'ah, the last revealed law of God, that Muslims could create, utilize, and apply science and innovation without disobeying the ethical moral limits [14].

Islam being the final religion revealed by God (The Almighty Allah) to mankind depends on a heavenly disclosure of the verses of Qur'an. Allah revealed the Qur'an to His envoy Muhammad (Peace Be Upon Him). Muslims trust that the Qur'an is Allah's (God's) word, that He (Allah) is the only source for providing the law, and that He has power over all things and the privilege to guide mankind. Allah says in Qur'an [15]:

"On this day, I have perfected your religion, completed My favors upon you, and have chosen Islam as your religion." (Qur'an 5:3) [16].

It is the belief of the Muslims that Islam is complete, total, forever and for all circumstances and situations and this is bolstered from an outright expression from the Qur'an "[. . .] Nothing have we excluded from the Book (Qur'an)" (Qur'an 6:38) [16]. The lessons of Islam put forward a lifestyle which lays its foundation on ethical qualities and viewed as a social arrangement of well-characterized features. Each act is a form of worship, drawing in rewards and the liking of Allah. The ideology of Islam gives mandates covering religious ceremonies, individual character, ethics, propensities, relationships with family, social and monetary issues, organization, rights, and obligations of people, legal frameworks, laws of war and peace, and global relations and the environmental protection of the earth [17].

The Qur'an orders to do good and denies

abhorrent deeds. Genuineness, reasonable managing, trust, equity, and reliability to a pledge are compulsory while as unfaithfulness, lying, and breaking of agreements are illegal. Islam gives an evenhanded harmony between the benefit of the society and the benefit of the general population [18].

More than 6000 verses which the Qur'an comprises of, many verses concentrate on moral viewpoints. Islam is essentially rooted in two sources: The Holy Qur'an [19] and Sunnah of Prophet Mohammed (Peace Be Upon Him).

The general comprehension of morals in Islam can be communicated as a

"Set of good standards and direction that perceives what is correct conduct from what isn't right or what one ought to do or not."

Qur'an and Sunnah, demonstrate that every one of the Muslims' life ought to be guided by Islamic morals. Allah said,

"Surely this Qur'an guides to that which is most upright" (Qur'an 17:9) [16].

Allah utilizes the term Khuluq or Akhlaq in the Holy Qur'an to allude to the moral principles. The significance of morals in Islam is indicated when Allah endorses Prophet Mohammed that he is the bearer of the most awesome morals,

"And verily, you (O Muhammad SAW) are on an exalted standard of character" (Qur'an 68:4) [16]. Additionally, Prophet Mohammed said, *"I was sent to supplement the best of morals."*

Allah commands the Muslims to take after and follow Prophet Mohammed as a role model *"Indeed in the Messenger of Allah (Muhammad SAW) you have a good example to follow"* (Qur'an 33:21) [16]. Allah portrays individuals of the best realm as:

"You [true believers in Islamic Monotheism, and real followers of Prophet Muhammad SAW and his Sunnah (legal ways, etc.)] are the best of peoples ever raised up for mankind; you enjoin Al-Ma'ruf (i.e. Islamic Monotheism and all that Islam has ordained) and forbid Al-Munkar (polytheism, disbelief and all that Islam has forbidden), and you believe in Allah." (Qur'an 3:110) [16].

Allah's Qur'an and the Prophet's Sunnah utilize a set of moral terms to depict the idea of goodness, for example, Sidq (Truth), Birr (Righteousness), Khayr (Goodness), Qist (Equity), Adl (Equilibrium and Justice), Haqq (Truth and Right), Amanah (Honesty), Ma'ruf (Known and affirmed) Taqwa (Piety) and Ikhlas (Sincerity) [20].

Devout activities are depicted as Salihat and reprobate activities are portrayed as Sayyi'at; some of those terms are rehashed in tens (10s) of Qur'anic verses and also in the Sunnah [21]. An overview result (term based recurrence) for the test of moral related terms utilized as a part of Qur'an is shown in Table I which demonstrates a review result (verse and hadith based recurrence) for the test of moral qualities utilized as a part of Qur'an and Authenticated assets of Sunnah [22].

Table 1: Frequency of good ethical characteristics in Qur'an and Sunnah (Adopted from [22])

Good Ethical Characteristic	No. of Verses	No. of Hadith
Ihsan (Beneficence)	66	29
Ikhlas (Sincerity)	23	34
Istighfar & Tawba (Forgiveness)	202	100
Amanah, Nazaha, Istiqama (Honesty)	65	66
Iswa Hasana, Irshad Islah (Good model and Guidance)	67	82
Wafaa Ahd, Ketman Ser (Keep promise and Secrecy)	31	50
Amr maarof Nahi munkar (Order goodness, prohibiting badness)	13	33
Eman & Taqwa (Belief and piety)	595	145
Morality, Husn alkhulug walmuamalah (Good ethics and dealing)	61	250
Hikman & hulum (Wisdom)	129	31
Alhamd, Alshukr, Althanaa (Thankfulness)	235	142
Sabr, Musabara, Kathm ghaidh (Patience)	108	64
Adl, Insaf (Fairness)	23	62
Sidq (Truth)	92	44
Rahma, Raafa, Rifq (Merciful)	227	124
Takrem Insan (Mankind priority)	96	24
Ilm , Amal (Science, Work)	530	139
Tafakr, Tadabr, Taaml (Thinking)	83	48

These studies demonstrate that Islam patronizes and rewards individuals for all decency

and cautions, precludes or rebuffs individuals for evil deeds.

Ethics are considered as a basic constituent in creating or revamping the society in Islam in view of comprehension of the Qur'an and Sunnah. This moral revamping of human conduct is supposed to bring an advantage, prosperity, and harmony to humankind. The moral conduct is influenced by a set of elements, which can be arranged by their level of impact into: Global, Nation, Community, Family, and Individual. Factually, Islamic framework is the one and only framework that is able to produce exhaustive researchers, for example, Ibn-Rushd, Ibn-Alhaitham, Al-khawarizmi, Ibn-Hayyan, Ibn-Albetar and Ibn-Sena. Every one of these scientists was researchers in their respective fields, for example, Hadith, Fiqh, Art and Language, Math, Science, Material Science, Medicine, or Space Science. These scientists can be considered as role models as they performed their jobs as indicated by the Islamic Ethics [23].

There are about 500 particular lawful directives in Qur'an that makes the body of Islamic law and morals called "Shari'ah". The Shari'ah defines the "is" and the "should" and endorses the lawful, societal, and political establishment in a community living under Islam. The primary goal of the Shari'ah laws is to ensure the welfare of the general population by giving advantages and limiting and repulsing evil and hardship [24].

3.1. Legal Maxims of Islamic Laws

Utilizing the aforementioned foundations of knowledge, the Islamic legal advisers have separated inductively more than 70 legitimate adages of Islamic laws as short articulations that represent certain laws of Shari'ah. These adages must be clinging to principles that can make a judgment which will convey benevolence and to keep away damage. Some of these adages which are common are [25]:

- Harm is to be dispensed with *(ad-dararu yuzal).*
- Harm is not to be exacted nor responded in Islam *(la drara wa la dirara fil-Islam).*
- Harm is dispensed with to the degree that is conceivable *(Ad-dararu ydfa'u bi-qadar al-imkan).*
- Harm is not dispensed with by another damage *(ad-dararu la yuzalu offer darar).*
- To prevent mischief is preferred over making

profit *(dar' al-mafasid awla min jalb al-masalih).*
- Individual interests submit to the public interests *(al-maslaha al-'ammah muqaddamatun 'ala al-maslaha al-khassa).*
- Specific damage is endured so as to prevent a broader one *(Yutahammal promotion dara al-khas lidaf'al-dara al'aam).*
- A more prominent damage is disposed of at the expense of a lesser mischief *(Yuzal ad-dara al-ashaddu offer drar al-akhaff).*
- If it is necessary, the unlawful can be made legal *(Ad-darutatu tubiyh al-mahthurat).*
- Necessity is measured as per its actual extents *(Ad-daruratu tuqdaru bi-qadriha).*
- Hardship creates comfort (ease) *(Al-mashaqqatu tujlab at-taysir).*
- In the instance of contention between two alternatives, the uncomplicated one is preferred, as it is nearer to reality *(Etha ekhtalafa alyka amran fa-ina aysrahoma akrab ela al-haq).*
- Uncertainty cannot overrule certainty *(Al-yaqin la yazul bil shakk).*
- The standard is to see a thing as reasonable unless its preclusion is proven *(Al-aslu fil-ashyaa' al-ibaha).*
- The basic premise for judgment is custom *(Al-'addatu muhakkamatun).*
- Not taking risks is the standard (of Shari'ah) unless the otherwise is demonstrated *(Al-aslu barraa'ah include thimmah).*
- The standard is that the norm stays as it was before unless it is demonstrated that it has undergone a change *(Al-aslu baqaa'u mama kaana 'ala).*
- The intentions behind the acts are responsible for judgement' *(al-umuru bi-maqasidiha).*
- An act is unlawful whether done by the individual or by specialist *(mama harum fil'luhu haruma talbuh)* [26].

4. NEED FOR MERGING ISLAMIC ETHICS AND ENGINEERING

Information Ethics (IE) and computers is a field of rising importance and keeps on characterizing new speculations investigating our upright and human instinct with regard to ever changing technologies and all common globalization. These hypotheses incorporate professional sets of principles, guidelines, rules, guidelines, advice, and computer data related enactments. Such speculations have rationally grounded morals [27]. The use of these guidelines

and codes has not been simple for clients, since there is no widespread concurrence on meanings of what is good and bad. Moral choices are in need of harmony between a few standards that might seem to clash with each other. Numerous philosophical sources are taken into account while developing moral hypotheses and basic leadership decisions but in the process, might have disregarded the custom of Islam as a potential epistemology for the development of ethical theory. Numerous researchers have required the consideration of religious principles to manage moral conduct [26], [28], [29], [30], [31].

There are some advocated motivations to incorporate Islamic moral values while designing the ideal models for software engineering. The basic reasons for the same are as follows:

i. Islam prohibits all immoral exercises in each and every domain of human life.
ii. The majority of the general population, including IT experts, is new to the moral infringement related to information technology.
iii. Making us act like responsible experts while working in various workstations.
iv. We ought to study IT morals that shall show us how to maintain a strategic distance from misuse and disasters related to computers.
v. The access to IT assets should be controlled for youngsters and encourage them for reasonable access to IT assets.
vi. IT morals are imperatively essential for clients to abstain from utilizing unlawful IT assets forever and require some moral problems independently.

In the Islamic world, everyone needs an ensured right in the morals of utilizing information technology. Often, software engineering is utilized wrongfully, encroaching its morals everywhere in the world. Its rights, which are as of now lawfully perceived, are being dishonored every day for the sake of advancement in economy, religious causes, political soundness, movements countering terrorism or for individual interests and avarice. Infringement of such rights has given rise to new issues in human social frameworks, e.g., cybercrime, the digital divide and protection concerns and computerized security. All these have influenced the lives of individuals either straightforwardly or the other way round. Despite the fact that our data frameworks have developed through data frameworks from data processing to artificial intelligence and robotics, there has not

been an adequate progression in managing the moral issues these advancements have produced. Ogburn's cultural lag hypothesis recommends that innovation is progressing speedier than the moral framework important to control and bolster these additions. That is the reason, ethics are important to curb software related misuse. Along these lines, Islamic morals are, in this manner, fundamental to extend the ethical research to help cross any barrier amongst conduct and advances in information technology. There are many purposes behind making a code of morals that apply to designing software and advancement, including the commonness of imperceptibility, natural namelessness, and the one of a kind flexibility (capacity to be "transformed" into whatever we can envision) of innovation in comparison to anything in our history.

There can be countless aspects which are purposefully disregarded in the field of software engineering. This is the case with the majority of employees and each of these characteristics can make noteworthy issues.

i.   Violations of Patents and Intellectual Property

Numerous householders of software, publishers of software, CD or DVD makers and in addition many individual consultants disregard copyrights and intellectual property laws by duplicating information, CDs, DVDs, recordings, pictures, logos, designs, software for computers, and so forth, feeling that it does no damage and this does not violate Islamic principles. As indicated by Shariat, it gets to be distinctly typical for companies related to software production to save the privilege of replicating their product and to maintain a strategic distance from others from any type of offense in this regard.

Ali (R.A), "Take knowledge and it would not harm you from where it comes." (Al-Sakhawi, Al-Maqasid Al-Hasanah).

As there are principles in Islam for the utilization of significant things, so there are additional guidelines for the utilization of scholarly resources. The computer program is overseen through the agreements that the proprietors or dealers make with the purchasers.

Allah says in the Qur'an:"O you who believe, fulfill the agreements." (Surah Al-Maidah:

1) [16]

The Prophet (P.B.U.H) said, *"Muslims must stand by their agreements, except an agreement that makes Haraam (unlawful) what is Halaal (lawful) or make Halaal what was Haraam."* (At-Tirmidhi, Hadith No. 1272) [32]

It is comprehended that it doesn't define any distinction whether the declaration of agreement is made between Muslims themselves or amongst Muslims and non-Muslims. Such product of software engineering ought to be utilized by the conditions of the agreement or what is typically acknowledged as Urf (a typical custom) among the people of the industry involved.

ii.   Avoiding What is Harmful

Not just in software engineering, but in the race of earning more and more, individuals are jostling to surpass one another. They simply don't care if the methods they embrace are lawful or not. Their sole motive is to simply run towards materialistic life even by snare or criminal. The Prophet Muhammad (P.B.U.H) said: *"That what is legal is clear, and that which is illegal is also pretty clear. Between the two is that which is vague, which most people are unaware. One who avoids the unsure protects his faith and his respect."* (Riyadh-us-Salaheen, Hadith no 588) [33]. The Prophet Muhammad (P.B.U.H) was asked that what type of earning is best, and he replied: *"A man's work with his own hands and every lawful business transaction."*(Al-Tirmidhi, Hadith 846) [32].

iii.   Politics in Workplace

The politics in the working environment can have a genuine impact on real business procedures, for example, making systems, planning, execution, evaluation, and administration. This takes place when people get involved in politics at the place of their work; it delays the flow of information in an organization. In order to gain a short-term advantage, the data can be made unclear and deluding. Prophet Muhammad (P.B.U.H) as narrated*, "Make your character good for the people" (Muwatta, Volume 47)* [34]. *"And spend your material in the cause of Allah. And not make your own hands contribute to your devastation; But do good, for God loves those who do good" (Al-Baqarah, 2: 195)* [16].

iv.   Equality and Diversity

"All human race is from Adam and Eve, an Arab has no lead over a non-Arab nor a non-Arab has any lead over an Arab. Learn that every Muslim is brother to every Muslim and that the Muslim comprises one brotherhood. Nothing should be lawful to a Muslim which belongs to a fellow Muslim until it was given unreservedly and willingly. Do not do inequality to yourselves...." Prophet Muhammad (S.A.W), Last Sermon. For the most part of time in case of software engineering, the area allotted to a project manager is considerably more than other web designers. Despite the fact that there is a small difference between them, and yet there exists disparity in incentives and salaries. In some companies, the staff doesn't get their compensation on time, which itself has a terrible effect on software houses. On Judgment day, the Prophet (P.B.U.H) will be witness against, *"One who employs a worker and gets the full work done by him but does not pay him his wages" (Abu Hurayrah and Sahih al Bukhari, hadith no. 3.430)* [35].

v.   Ignoring the Duties Towards Azaan

Another basic problem prevalent is not reacting to Azaan, and continue talking while it is going on. Described Abu Said Al-Khudri: Allah said, *"Whenever you hear the Azaan, say what the Muezzin is saying."* It is compulsory on each Muslim to i) Show respect for the Azaan by halting discussion, even if one is reciting Qur'an. ii) Remain focused on the Azaan, iii) Repeating the Azaan after muezzin.

vi.   Humility

At the point when individuals are supposed to cooperate with each other while working, they do begin provoking and mortifying others in a particular form which is absolutely taboo in Islam. The utilization of language that is abusive is rejected while it is expanding with each passing day. *"The true servants of Allah, the Most Gracious, are those who walk on the earth in humbleness, and when the bad-mannered address them, answer with words of peace" (Qur'an 25:63)* [16]. The Prophet (P.B.U.H) said, *"Shall I tell you about the people of heaven? They include every vague unimportant modest person, and if he takes Allah's promise that he will do that thing, Allah will fulfill his promise by doing that. Shall I notify*

you about the people of the hell? They consist of every unkind, aggressive, arrogant and proud person" (Narrated by Haritha Bin Wahb vol 8, Sahih Al-Bukhari hadith 97) [36].

vii. Working Women

The ladies that work in the field of software engineering are ending up being more modern. Their dressing measures are appalling. The ground reality is that they are losing their valuable respect. They feel that they can win more by uncovering, which is an absolutely wrong idea. It is a normally observed pattern that the ladies working in software engineering companies are dressed overly with vogue clothes with a specific end goal to make themselves more revealed. In addition to wearing costly adornments, they wear tight fitting clothes which reveal their body figure. *Wealth is not due to a lot of money, but wealth is the wealth of the self (Prophet Muhammad (P.B.U.H) as decided upon--mutafakkunalaih). And order the Muslim women to lower down their sights a little and guard their chastity and show not their adornment but as much which is itself apparent and remain putting their head-coverings over their bosoms. And disclose not their adornment but to their husbands, or to their fathers, or the fathers of their husbands, or to their sons or the of sons husbands or their brothers or the sons of their brothers or the sons of their sisters or the women of their religion or their handmaids who are the property of their hands or servants provided they are not men of sexual desire or the children who are unaware of the private parts of the women; and put not their feet forcibly on the ground that hidden adornment may be known. And repent to Allah, O Muslims all together, haply you may get prosperity (Qur'an 24: 31)* [16].

viii. Revealing Secrets of Others and Backbiting

Tattling and talking behind others' backs is an exceptionally well-known leisure activity in places of work. Sitting around idly and not doing the job allotted is a transgression and it is a major sin to backbite somebody. *"God orders you people to return things entrusted to you to their lawful owners, and if you judge between people, to do so with fairness" (An-Nisa, 4:58 -Qur'an). "Every spirit is held in oath for its actions" (Al-Muddathir, 74:38- Qur'an)* [16].

ix. Professional Jealousy

In places of work, it is quite normal that there is a sense of jealousy among the colleagues and its cure is practically impossible. Envy gives away the faith of a man. It is a calamity for religion. At times a man who has been bestowed with reward by the God turns into an adversary of either God Himself or of that reward and subsequently turns into a skeptic. The Holy Prophet (P.B.U.H) said: *"Verily there are enemies of the heavenly rewards." It was asked who is an opponent of Allah's reward? He replied: "One who became jealous of those whom God has given reward."*

x. Trust in Company Communication

Trust is the most critical factor of moral control in the dealings of business. Trust is a moral strength in performing an assignment by a Muslim in the execution of his issues. It requires trustworthiness in employment and clarity of aim from every individual. A Muslim professional will dependably concentrate on his "Akhirah" instead of the gains of this world. He will maintain a strategic distance from cunningness, double-dealing, and other debatable ways in his dealings. Muslim will build up a level of trust by advertising the upsides and downsides of the items to the purchaser, with the goal that client buys the item in full fulfillment. *"O, you believers! Do not betray Allah and the Messenger, nor knowingly, betray your trusts" (Qur'an 8:27)* [16], [37].

4.1. Islamic Ethics for Software Engineers

This arrangement of standards is for all humankind, including software and computer experts. While holding fast to these convictions and qualities, software engineers are required to cling to the following:

1. *Acting as vicegerent of Allah*: The primary goal of the creation of all humanity by God (Allah) is to worship Him; by evolving and recreating the earth for the good (as vicegerent or Caliph) by means of their good deeds and activities. Allah stated, *"I have only created Jinn and Men that they may serve me" (Qur'an 51:56)* [16].

   "Allah thy Lord said to the angels: I will create a vicegerent on earth" (Qur'an 2:30) [16].

2. *Performing duty is worship*: The professionals related to software engineering need to realize that, doing their jobs is a form of worship and Allah will compensate them for goodness and

rebuff them for evil. Allah said in Qur'an *"Then shall anyone who has done an atom's weight of good, see it and anyone who has done an atom's weight of evil, shall see it" (Qur'an 99:7-8)* [16]. In a Hadith, the Prophet said, "Work is worship".

3. *Understanding and following the standard ethics, particularly Islamic ethics*: The professionals related to software engineering including end clients need to comprehend the standard Islamic morals (in view of Qur'an and Sunnah). They need to regard it as the most elevated standard which they ought to follow in their work as well as life.

4. *Remembering the Judgment day*: The engineers related to IT and software including end clients need to realize that doing goodness and creating valuable information will be compensated by Almighty Allah in their life and even after death on the Day of Judgment.

5. *Management with honesty*: The professional IT leaders and managers should adhere to and put forward a moral way to deal with the administration of hardware and software improvement and their maintenance. They need to demonstrate the genuineness (Amanah) and value while doing their job.

6. *Working with the highest profession*: The professionals related to software engineering including end clients need to promote the honesty and status of their profession in line with the interests of the Ummah (nation). They need to put in their best efforts utilizing their profession.

4.2. Professional Ethics in Light of Islamic Principles

This arrangement of standards is devoted for all IT experts. It incorporates:

1. *Doing no harm*: Not once should a professional deliberately permit harm to others because of his activities, or inactions.

   "O And withhold not things justly due to men, nor do evil in the land, working mischief" [13].

2. *Seeking to understand first, then to be understood*: Enlarge your compassionate capacities to comprehend and adopt the

influences your activities may have on others.

3. *Fair Representation*: Realize the pledges you commit – do the same thing as you have implied. Generally, individuals should be spurred to quit finding excuses and to go up against more prominent individual and social obligations.

   "O ye who believe! Fear Allah and be with those who are truthful."

   The Prophet (saw) said: "*The trader must avoid five qualities, otherwise he should not buy or sell: Usury, swearing by God that the merchandise is good, withholding the defect, commending (the commodity) when selling and belittling (it) when he is buying*" (Tahtheeb al-Ahkam Ch. 7) [13].

4. *Do not misuse your privileges for accessing private information*: IT experts have exceptional access to secret data which demands a larger amount of self-restraint.

5. *Making every effort to thwart illegitimate disclosure of private information*: To ensure genuine, unprecedented access and data security that has been legitimately accessed is of central concern, and ought to be considered important.

6. *Utilizing current technology for protection of private information*: Assist to progress and utilize innovation created by our associates - to give data security, and the transporting medium. Utilizing innovations, for example, encryption and Secure Socket Layer are an essential factor of our regular daily lives.

7. *Striving to improve the security of private information*: Abstain from disseminating data that is known to be deficient, erroneous, inappropriate, or inaccurate. On the off chance that you are aware of the wrong private data, or notice information which is not being legitimately taken care of or secured, it is your duty to correct any occasions of inaccurate, unprotected, or despicably taken care of private data - or tell somebody who can.

   "O ye who believe! Avoid suspicion as much (as possible): for suspicion in some cases is a sin: and spy not on one another, nor speak ill of each other behind their backs. Would any of you like to eat the flesh of his dead brother?

Nay, ye would abhor it. . . But fear Allah: for Allah is oft-Returning, most Merciful."

"O Do not do mischief on earth after it hath been set in order, but call on him with fear and longing (in your hearts): for the mercy of Allah is (always) near to those who do good."

8. *Do not forward as your own the work of others without proper acclaim to the author*: Irrespective of the copyright status, it is inadmissible to utilize the work of others for expert or individual benefit without the copyright holder, creator, or proprietor's proper authorization.

    "O you who believe! Do not consume your property among yourselves unjustly unless it be a trade amongst you, by mutual consent. And do not kill yourselves (nor kill one another). Surely, Allah is Most Merciful to you."

9. *Staying abreast of changes in social theory and public policy*: Ethical qualities are all around organized by ideas of equity, rights, mischief, decency, and welfare. Extend your own particular good thinking by slowly comprehending these ideas, making a custom for successive individual examination to examine your doings, and perceive opportunities for enhancing future choices managing moral issues and clashes.

10. *Only accessing that information which is required for completion of your task*: It is not important to examine through every accessible data to finish the job you are given, though, it is dependent upon you to choose what information is required. Because of this, it is your obligation to guarantee you just utilize what is needed.

11. *Do not attempt to access networks or computers on which you are not authorized*: An IT professional understands the significance of computer and system security, in this manner attempts to access computers and systems you have no approval to is seen as unethical.

    "O If ye find no one in the house, enter not until permission is given to you: if ye are asked to go back, go back: that makes for greater

purity for yourselves: and Allah knows well all that ye do."

12. *Actively educate, and appropriately inform those inspired by the populism's of information technology based on ignorance*: You should stand up to the individuals who hone unscrupulous acts in garb of social standards and educate them of potential damage it does to the other people involved, and in addition the common, intelligent, and legitimate outcomes of doing such things. Never try to make or raise the reliance of clients for individual profits, for example, professional stability.

13. *Do not try to gather information for the purpose of identity discovery*: There is an implicit desire for security and assurance through obscurity. IT expert's entrance to different databases with secret data permits them to have the capacity to reveal somebody's identity. The only exemption to this code shall be for legitimately approved law requirement purposes.

14. *Foster "voluntary cooperative action of groups and individuals" in compliance with the code, since it is secret to the success of any Code of Ethics*: Persons and associations (organizations, foundations, governments, and so on) are both indebted to have ethical and moral obligations of their behavior and doings amongst each other, to the general population influenced straightforwardly by their activities, and to the overall population who might be influenced by those activities later on [38], [39].

4.3. Recommendation for Software Engineers

The software engineers working in public domain ought to act reliably and in line with the interests of the general population. The software engineers ought to act in a manner that is most beneficial to their customer and manager, and simultaneously in line with the interests of the people in general. The software professionals ought to assure that their items together with their related alterations meet possibly the most noteworthy expert benchmarks. The professionals related to software development ought to uphold independence and trustworthiness in their expert judgment. The related managers and group leaders ought to follow and endorse moral ways of dealing with the administration of development and maintenance of software. The software engineers

ought to promote the respectability and status of their profession in line with the general society. The IT professionals and engineers ought to be reasonable and helpful to their associates. They ought to take an interest in deep-rooted learning concerning their profession and ought to endorse moral ways of dealing with the practice of their profession [13].

5.   CONCLUSION

The development of the revolution in the field of information and technology is sensational. We could be in a bad position in the event that we don't give enough importance to the way we are developing the new environment in which our future generations will live. Though moral and expert standards for IT clients including experts were embraced by expert associations and advisory groups, for example, IEEE, ACM, ABET; yet some universal review demonstrates that IT clients including experts are still confronting numerous moral related issues. Islamic sources i.e. Holy Qur'an and Sunnah, give an exclusive standard of morals for distinct persons, groups as well as Ummah (nation) levels. Islamic morals are steady, thorough, reasonable and standard that are appropriate for all countries and times; and when taken after prompts to make a morally awesome society. The paper takes these morals as the primary guide and additionally the new standards for IT clients in view of Islamic moral qualities are set. This effort can help in fathoming a large number of the current moral related IT clients' issues. It offers a decent chance for IT clients particularly Muslims to comprehend and actualize such standard and complete moral principles throughout their life and also playing their part correctly in their respective workstations. Being a Muslim, everyone must keep in mind the Islamic values while carrying out specific tasks. However, it is the primary obligations of top authorities of the software development firms that they help develop an environment where their employees could share their religious thoughts frequently. They should conduct proper trainings and workshops by calling well-known Islamic scholars from the community.

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