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Spiritual Dimension of Technology

Humans have always had an identity crisis. For much of our recorded history, we have used rather specious definitions of humanness or personhood that granted power to some, while granting few or no rights to others. At times some have thought our gender or the color of our skin formed a key part of that definition. If we have erred too narrowly in the past, do we now risk erring too widely?

Some 23% of Americans, and a higher percentage of Europeans, say they belong to no religion in particular. Although this is the result of a centuries-long retreat from faith, the process may have come full circle.

Secularization happened in four stages, each one with its own century:

- The 17th century was the secularization of knowledge. This referred to knowledge without any dogmatic assumptions in the form of reason and observation, philosophy, and science.
- In the 18th century came the secularization of power with the American Revolution and the First Amendment, and the French Revolution, which emphasized the substantive separation of the state and church.
- The 19th century was the secularization of culture when the museum, and the concert hall, and the art gallery took the place of houses of worship as places where you encountered the sublime.
- The 20th century saw the final secularization, which was the secularization of morality. In the 1960s, throughout the West, the two foundations of the Judeo-Christian ethic, the sanctity of life and the idea that there is such a thing as a sexual ethic involving fidelity and the covenantal nature of marriage disappeared throughout the West.

Having gone through four stages of secularization, there are no more stages to go through, short of complete atomization of society.

Four great institutions of the state, market, technology, and science are not able to provide a response to the following questions which any reflective

person may ask throughout his lifetime: who are we, why are we here, how then shall we live?

The science explains to human beings the how part, yet not the *why* part.

Technology empowers individuals, yet it does not explain how to put that power into use.

The market provides individuals with choices, yet it does not guide individuals on which choices to make.

The liberal democratic state may provide a maximum degree of freedom, yet it does not provide any guidance as to how to use that freedom.

Within the light of this information, it is not difficult to see how religion will make a return.

The West is not going forward bravely to the future. It is marching heedlessly to the past. People of all faiths may keep asking whether the West can survive without the faith that created that cherished body of rights, liberties, and civil protections that are now vaguely referred to as "British values," or "European values." The fundamental truth that is at the heart of the Qur'an is that the governors exists to serve God through their people.

Our Islamic culture drew from its faith tradition the understanding that all life is sacred, that human persons should enjoy freedom from arbitrary coercion, that we should serve others by engaging our God-given gifts in service of our personal vocation.

At the core of every civilization, religion has been a major approach, therefore, to ignore religion would be to ignore the legacy of the civilization along with its achievements.

Human nature, as fashioned by the Almighty, yearns for purpose, meaning, and deeply significant relationships. The soul in its loneliness stretches out longingly for the transcendent. Even the technology, which provides a seemingly endless variety of utilities and gratifications, cannot meet that need. Nor is it clear that the form it has taken for the last century can endure without it.

Humans have been augmenting themselves with technology since the beginning. Marshall McLuhan suggests that technology and media are "extensions" of ourselves. Tools are, by definition, an augmentation of some ability, from hammers, which help us pound harder, to telescopes, which help us see further. Sometimes we use technology to repair, such as using a splint to guide the healing of a broken bone. Despite this close relationship with our tools, until recently the line between ourselves and our technology was fairly clear. When the technology becomes an integral part of our bodies, the line is a bit more ambiguous. For a person with an artificial hip or heart,

most would agree on which part of the person was human and which part was technology. It gets a bit fuzzier if we modify someone's cells using gene therapy. According to Henk Geertsema, the use and development of technical tools to improve certain functions of the human body does not eliminate the difference between machines and human beings. Yet, how much of ourselves can we replace and still remain human? Although in ancient times the heart might be considered the seat of emotion and central to our humanity, in modern times the artificial heart would not disqualify one as being human. What if I start augmenting the human brain? Would a "brain prosthesis" ever be possible? Nanotechnology enhancements might still be years away, but one could consider cochlear implants for the profoundly deaf to be a forerunner of brain augmentation.

The way in which questions such as these are answered reveals certain philosophical presuppositions about what it means to be human. If one presupposes that the material world is all that exists, a notion referred to as materialism, then it is not a far leap to suggest that people are no different from machines. Such a worldview suggests that our mind, consciousness, and our entire person arise entirely from the physical interactions of particles in the brain, a view sometimes referred to as physicalism.

Physicalism has several significant implications. For one, illnesses of the mind are reducible to an illness of the body which can be treated by pharmaceuticals. Matthew Dickerson, in his book ***The Mind and the Machine***, makes the case that physicalism has far-reaching implications for areas such as creativity, heroism, ecology, as well as for reason and science. Furthermore, physicalism suggests that brains, and hence minds, could be entirely simulated in a computer.

At the very beginning of computing history which was around World War II, the main principles in computer science have been uncovered by the famous mathematician Alan Turing who asked in his phenomenal paper **"Computing Machinery and Intelligence,"** the question of whether machines could ever think and if so, whether there would be a way for us to know. In order to find out the answer of this question, Alan proposed a test to specify whether a machine could be described as "thinking." According to this test, an individual was sending messages to both a remote human and a computer while sitting in a room, and was trying to understand which is which. According to Turing, if this individual could not tell the difference between the computer and the human being, then one could classify the "machines thinking without expecting to be contradicted." This famous test has been referred to as the "Turing test."

Turing's early writings were followed by rapid developments in computing and the development of the field of "artificial intelligence" or AI. The notion of "thinking machines," the basis for the field of AI, naturally leads to many philosophical questions such as follows: What is a mind? Will machines be able to think as humans do or can they just calculate? What does it mean to be human? What is the difference between people and machines? Could machines ever have free will?

Tests like the Turing test are based on the faulty presupposition that to mimic a human implies that something is human. As machines are increasingly able to do things that people do, distinguishing humans by the functions they can perform will become less meaningful.

Ray Kurzweil, an accomplished computer scientist and author of several books including ***The Age of Spiritual Machines***, suggests that within the present century we will be able to download our brains into a computer and thus escape our mortality. All that remains to achieve this is for neuroscientists to map the brain and for sufficiently powerful computers to be developed. At that point, it is suggested that our brain could be uploaded into a computer and can live forever in this way without being restricted by our mortal bodies. Some have coined this "**the rapture of the geeks**." This vision has inspired **books**, **conferences**, and efforts like that of the **Terasem Movement Foundation**. In the case of the rapture of the geeks, the end goal results in literally becoming like a computer.

The goal of downloading brains into computers is based on a materialist worldview which sees the physical world as all there is, as an independent reality, self-existent and hence divine. In turn, it is the materialist reduction of what it means to be human that allows the rapture of the geeks to be conceivable. This worldview connects a trust in technology, a rejection of God, and a reductionist view of what it means to be human. A knowledge of God as the creator is tied to an understanding that as fallible creatures we need a Supreme Savior.

Such a worldview reveals a trust in technology, one that even promises eternal life. Andy Crouch claims in his latest book the following two simple promises provided by every idol:

- "You shall not surely die."
- "You shall be like God."

The Qur'an includes several verses on the subject of worshipping such idols.

> *"It has been revealed to you, and to those before you that if you ever commit idol worship, all your works will be nullified, and you will be with the losers." [39:65]*

> *"Indeed, his crops were wiped out, and he ended up sorrowful, lamenting what he had spent on it in vain, as his property lay barren. He finally said, "I wish I never set up my property as a god beside my Lord." [18:42]*

Different schools of thought in ontology (the philosophy that explores the nature of being or existence) have suggested anthropologies that affirm or deny the existence of at least three different parts: the body, mind, and soul. The body is composed of our physical self, including our neurons and brain. The mind consists of our thoughts and consciousness. The soul is "that part of us that might be said to be eternal or to transcend in some way the mortal body." Most anthropological views can be categorized as either monism or dualism. Monism asserts that humans are made of one substance. Thomas Hobbes was an early supporter of monism by arguing that consciousness and souls arise from the functions of the body alone. In contrast, dualism holds that humans are somehow made up of two parts, often identified as the body and the soul. Dualism includes many theories about how the body and soul are separate but related. Platonic dualism saw the body as an earthly package for the spirit, something to be eventually discarded. René Descartes, an early modern philosopher who promoted a form of dualism, suggested that the body is like a machine that interacts with the mind. Although the Qur'an is not a philosophical anthropology textbook, there are many verses indicating that we are more than our bodies. God says in the Qur'an:

> *"And when the souls shall be joined with their bodies." [81:7]*

More recently, many modern Western philosophers have embraced materialism, which is a form of monism that denies the presence of a soul and holds that reality is made up of only the physical stuff around us. In his book, The Concept of Mind, Gilbert Ryle rejects dualism and ridicules it as "the myth of the ghost in the machine." Similarly, a materialist view has been promoted by Ray Kurzweil in a series of books such as The Age of Spiritual Machines and How to Create a Mind. This perspective dismisses the notion of a soul, concluding that our mind and consciousness arise entirely from the physical brain. Some materialists account for the complexity of the mind by attributing it to the interactions of many simple entities, like an ant colony.

Although each ant appears to act at random, more complex behavior emerges at the level of the colony.

Our view of human personhood has profound implications. For instance, a materialist view applied to the mind (sometimes referred to as physicalism) will conclude that all illnesses of the mind or spirit are reducible to an illness of the body which can be treated by pharmaceuticals. For a physicalist, being human simply reduces to the interactions of basic particles. However, if we consider ourselves as more than simply a physical body, how does that shape our view of what it means to be human?

Some technologists working in AI have not aimed for replication of humans, but rather for intelligence. Is intelligence, the ability to learn and to apply that learning, an essential quality of humanness? Is it a unique talent of humans alone, unattainable by any other natural or artificial creature? Could a machine have excellent logic and rationality, surpassing humans at deductive reasoning? In 1997, IBM's supercomputer called as Deep Blue could beat the famous world chess champion Kasparov.

Another essential quality of humanness is sentience, which refers to our ability to perceive. Douglas Hofstadter, in his famous 1979 book Gödel, Escher, Bach, explored ideas of recursion, self-reference, and the idea of the "strange loop" as possible layers that might allow the whole to be greater than the total of its parts. This is the idea of emergence that simple components can interact so that a more sophisticated, perhaps intelligent, behavior emerges.

Another essential quality of humanness is emotion, which is often considered a part of our intellect, but a peculiar component that is not logical or calculating, even though it can often be predicted. Emotion seems to be connected both to our state of mind and to our bodies. Emotion makes our hearts race and our hands sweat. It puts the bounce in our step or the frown on our face. In order to feel emotions, one must have both intelligence and self-awareness.

Furthermore, as Muslims, we consider the soul an essential part of our being, in fact, the one part that survives our death. In addition, this is often the attribute that many believe uniquely defines us as humans, particularly when other attributes do not seem sufficiently unique because we find them at least partially in other creatures. The soul seems to be confined to humans. However, one cannot measure for the presence of a soul as a test of humanity. The computer scientist Matthew Dickerson makes the astute point that assuming we can scientifically test for the spiritual assumes that the spiritual is reducible to the material, which is equivalent to saying that the spiritual does not exist.

Rather than distinguishing humans by how they think, as homo sapiens, many point to our ability to make tools as what distinguishes us from other creatures. Thus, we are homo faber, humans as makers. Inventing novel devices, composing new music, and innovating in business are all examples of creativity that may also be hints of an essential quality of our humanity. Humor is a type of creativity required to banter about with one another, and laughter is sometimes considered uniquely human.

Another essential quality of humanness is free will. We cannot be held morally responsible for an act unless we have a choice (to act or not to act). Moral agency, the ability to choose, and to be held morally accountable for our choice, is perhaps uniquely human. While some would argue that a computer can never be human because it cannot truly make a free will choice, others counter that humans cannot make a free choice either, thus subscribing to some version of determinism.

Taking a materialist view to its logical conclusions would deny the very possibility of many of the attributes listed above. As physicalism applies the principles of materialism to the brain, our brains are considered as natural phenomena, and as a result, the laws of cause-and-effect found a manifestation in machines as well. A strict physicalist view would deny the presence of a soul, suggesting we are just bodies operating under physical laws. In addition, it would reject the notion of free will. Furthermore, if our thoughts are merely the "interactions of basic particles" then true creativity is also an illusion. Matthew Dickerson argues that "to the extent that creativity is defined in terms of originality . . . physical automata, whether the digital computer variety or the biochemical human variety, are not capable of originating anything."

Materialism and physicalism are highly reductionistic with profound implications on how we view our humanity. Human attributes such as souls, free will, creativity, and emotions are essentially an illusion reducible to the laws of physics. Furthermore, it has implications for our understanding of knowing and truth. Materialism can be considered as a category of naturalism, and according to C. S. Lewis, naturalism provides a complete account of our mental behavior, which does not provide any insights on which the complete value of our thinking, with regard to truth depends, or in other words, there is no room for the acts of knowing. Ironically, a physicalist view of reality even leads to devaluing of our physical bodies, potentially leading to a new kind of gnosticism. Even if one rejects a physicalist view, it is not clear that any of these attributes or any other proposed characteristics can definitively categorize humans and non-humans. Not only is it difficult to conclusively

identify those attributes that are sufficient, it is also difficult to simply list which ones are necessary. Perhaps the value of such a list is not as a tool to determine who is in the human "club," but rather to encourage and challenge each other to flourish and grow toward the best humans we can be.

Matthew Dickerson argues that creativity is the ability to make something original and "to bring into being something new, which does not proceed entirely from what has gone before or what already exists." He argues that machines are controlled by physical causes (predictable or unpredictable) and therefore, by this definition, cannot be creative. Esthetic ways of knowing cannot be simply reduced to physical processes. In contrast, a materialist view of humans would suggest that creativity is just an illusion. Regardless of how we understand our status as created beings in the likeness of our Creator, there is a danger to defining a line too tightly around our humanity. If we define ourselves as intelligent beings, then what does that say of people of below average intelligence? If we require emotion or creativity, what does that say of the person lying in a coma? Thus, the danger in circumscribing our humanity too tightly is that we consider certain people as somehow less human, whether they are a fetus, a senile elderly person, a man in a coma, or a child with a severe brain injury. It would be a mistake to define some kind of litmus test for what it means to be human based on attributes such as intelligence or creativity. Our ontological status as humans seems to be distinct from the rest of the creation (including machines). This implies that human personhood needs to be attributed even when certain human attributes are less evident due to age, capacity, or infirmities. A materialist would reject the notion of a soul, free will, and creativity since this viewpoint sees everything as determined by natural laws. An Islamic perspective is shaped by the understanding that God created us with the ability to respond to him, and with that ability comes freedom and responsibility. Freedom and responsibility imply that we have a choice. The ability to choose (and especially to make a moral decision) is perhaps the most difficult attribute to understand about ourselves. How can the creator give the thing he creates the ability to do something other than what the creator intends? And yet that is what God gave us. This ability touches on the paradox between election and free will. This ability makes us human, and perhaps more than any other ability makes us distinct from machines, but this ability also allowed us to fall.

Views such as materialism elevate, leaving aside any type dependence or responsibility to God, one aspect of human being to be the ultimate one. Anthony Hoekema classifies this as a type of idolatry as it makes worshipping an aspect of creation rather than the creator. Others place their trust in the

hope that one day we will be able to download our brains into a computer and thereby achieve a kind of immortality. This is an example of technicism, placing our trust in technology as savior of the human condition.

From the early days of computing, entertaining examples of software pretending to be a person have arisen, such as the ELIZA program written in the 1960s that responded in natural language using scripted pattern matching. Today's expert systems can be surprisingly humanlike, such as computerized call center operators that understand a wide variety of spoken phrases, or the IBM Watson supercomputer that can defeat even the best humans on Jeopardy!, the popular TV game show. Even our smartphones are getting smart with us, with Siri providing helpful and sometimes entertaining answers to our queries. The Google autonomous car has demonstrated the ability for intelligent software to navigate a vehicle in complex environments. Web search engines routinely provide relevant results with both accuracy and speed.

Following his work with ELIZA, Joseph Weizenbaum reflected on the appropriate role for computers. He concluded that computers ought not to be used for tasks that require wisdom. Weizenbaum goes on to conclude that "there are limits to what computers ought to be put to do." Our purpose is to love and respect God, to fulfill his commands, to establish justice on this earth and to show mercy toward other human beings. These are things that we ought not offload to machines. Why? Regardless of the question of whether machines could actually do these things, humans ought not delegate those tasks that form our very purpose. Tools that aid us in our purpose are commendable, but tools that purportedly perform our purpose instead of us are condemnable. Imagine inventing a machine that rather than helping us pray or worship, instead does our praying or worshiping for us, so that we no longer feel the need to do it ourselves. Such a machine would be completely misguided, and the users of such a machine would be truly deluded.

We could use AI technology to help us seek justice by enabling an attorney to help less fortunate members of society at a reasonable cost, by using an expert AI system as a first contact "help desk." However, it would be important that the attorney does not simply sit back and let the expert system provide the only advice to the client. Rather, the attorney ought to use the expert system as an assistant to do a first interview, so that her or his in-person follow-up meeting with clients is more effective. Some might argue that manual labor is drudgery and the machines free us to do more creative work. Now with AI, we have a new variation of this dilemma as expert systems are developed in order to replace experts such as doctors, lawyers,

or perhaps even engineers. But does freeing us from labor free us from the very activity that makes us human? In his book The Glass Cage, Nicholas Carr provides a nuanced discussion on the many effects of automation illustrating that it is an ethical choice since it shapes our lives and our place in the world.

We could use AI technology to help us love mercy. For example, AI image processing systems already exist today that can detect certain types of breast cancer in mammogram images better than human doctors can alone. As another example of mercy, we could enable caring by providing a first contact for call centers with AI natural voice recognition so that trivial tasks could be completed routinely, while ensuring a human operator smoothly steps in for more creative and service-oriented needs. Home automation systems could enable the elderly to maintain independence longer by assisting them with everyday tasks such as cleaning and meal preparations. However, it is important that such systems do not entirely replace humans. For instance, the design of AI programs and robots should recognize social norms and not be employed to replace human care and companionship. Sherry Turkle observes that any relationship with a robot is a relationship only about one person. We could use AI technology with humility by recognizing our own human limitations. If we are uncertain of the status of our AI creations, then in humility, perhaps we should avoid such pursuits. That is, perhaps there is a line beyond which we may develop technologies for which we no longer fully comprehend the implications. We have a long history of letting the genie out of the bottle, and we know you can never put him back in. This is the risk illustrated in the tale of the "sorcerer's apprentice." However, even if some or even most agreed to be prudent with research and development, a few might continue these developments. As we consider the AI tools we build, we need to keep in mind our purpose. All technology is utilitarian: we develop tools as means toward ends. But technology has a bias, and this bias shapes us as we use our tools. How can AI help us fulfill our purpose without the means distorting our ends? For one thing, we should not aim to develop thinking machines that replace us, but rather to develop thinking machines that aid us in thinking ourselves, that augment and extend our abilities. On the topic of AI, Fred Brooks suggest that we should explore intelligence amplifying software to work together with humans rather than focusing on building "giant brains." In a paper on the benefits and risks of AI, the authors conclude that "Some of the most exciting opportunities ahead for AI bring together the complementary talents of people and computing systems."

The computer scientist Edsger Dijkstra once wrote that the ability of computers to think can be considered as being similar to the ability of submarines to swim. Regardless of where one stands on this question, it is clear that AI raises many fundamental questions about what it means to be human. These questions include issues of philosophical anthropology and the notion of the body, soul, and mind. It includes questions about what makes us uniquely human and whether a machine could ever replicate that. Many attributes are associated with being human such as intelligence, emotion, creativity, and free will. Views that suggest that computers can completely replicate humans are largely based on a materialistic view of humans. The implications of materialism lead to a denial of many of these attributes, such as free will, creativity, and the soul. In fact, materialism can lead to a rejection of the body as people seek to shed their mortal bodies and look forward to downloading their brains into virtual environments. Instead, there is another view of what it means to be human and why we are here on Earth based on the Qur'an. The Qur'an describes who we are as stewards created by God who have been granted freedom and responsibility. We are called to do good deeds also by participating in the use of AI and technology. The question of how should Muslims think about thinking machines is not just an academic exercise nor is it just fodder for science fiction movies. This question leads to fundamental beliefs about what it means to be human. As we better understand a Qur'anic view of ourselves, we will also better understand our relationship to our machines and technology. We are called to use AI in responsible ways that lead to human flourishing and exercising humility to avoid possible harm. We also recognize that there are some things for which AI ought not to be used and which may require limits. Differing philosophical presuppositions lead to very different conclusions about the place and use of AI. These technologies are not neutral, not only in the presuppositions behind them, but also in their increasing impact on our work, our culture, and our world. In humility and in recognition of our capability to commit sin, we should aim to develop tools that ameliorate the effects of sin, enhance justice, and show mercy. In short, our tools should aid us in working as redemptive agents.

From a faith-based perspective, there are several things that provide value to the work of the technologist. Considering the potential of technology to empower relationships among the community members, they can heal the broken world and restore the capacity of human beings to do good. Technological developments not only can provide means to eliminate diseases via vaccines, but also can minimize human suffering.

Dr. Edward W. Younkins asserts in one of his articles on human flourishing that abilities, potentialities, virtues, and individual human potentialities should all be put into rational use in order to pursue one's own freely and rationally chosen values and goals. An action is conceptualized as being right if it results in the flourishing of the person undertaking the action. As self-actualization requires the fulfillment of individual capacities based on a moral accomplishment it can also be considered as moral growth.

Moreover, certain social, legal, political, and economic conditions are required in order for human flourishing to occur as each individual life should be protected and justice should be maintained. The freedom to make decisions is an essential aspect for the achievement of individual flourishing. A mere focus on "justice" and "peace" would not suffice to make long-term plans about a truly just and free society.

It would be a mistake to conceptualize human beings as only being happy or feeling fully alive. The following relationships are important for flourishing:

- God and self,
- Others and self,
- Self and self.

As it is said in the Quran,

> *"It is He who has appointed you vicegerent on the earth…" (Quran 6:165).*

Indeed, the Muslim's character (khulq) is one that is to be inclined to moderation and conservation rather than excess and wastefulness. The role of human beings in general, and Muslims by extension even more so, is stressed in seven Quranic verses that tie stewardship (khalifa) to the responsibility of human beings to carry out this trust (amana). The Prophet (peace be upon him) said,

> *"The world is beautiful and verdant, and verily God, the exalted, has made you His stewards in it, and He sees how you acquit yourselves" (Saheeh Muslim).*

Given this crucial relationship between God and self in addition to the others and self, flourishing should be described neither as collectivism nor as raging individualism. Flourishing starts with the Creator, entails personal responsibility, and also has an emphasis on the common good. Strikingly, in order to establish a community based on faith, what is required is a bond

of the human heart rather than space, time, matter, or any other "chance" relationship in the world. As this is an act of Divine Grace, no amount of earthly means or human will can bring it about. Allah says in the Qur'an:

> *"…And remember the favor of Allah upon you – when you were enemies and He brought your hearts together and you became, by His favor, brothers…" [Quran 3:103]*

Therefore, only the Creator alone can bring together the hearts of individuals and binds them.

Among the noblest of means of human flourishing would be the realization of final goals at worshipping God as the ultimate end. Human beings' highest end is to glorify God.

Unless human flourishing takes as its starting point Creator Himself, it may end up with mere self-fulfillment.

In addition to making God the center of everything we do, we should also take the right to dignity; the rule of law; wealth creation; the role of the family along with the principles in the Islamic tradition like serving the poor and doing justice in order to realize flourishing.

Given the proliferation of technologies into our daily lives, can humanity get through the current period of upheaval and economic malaise and enter a "new age" of broad economic growth? Millennials are especially concerned with their sense of work and its meaningfulness. In an age when the tools of economics including social media are too often seen as mechanisms for materialism, faith should foster far more than mere theology by infusing meaning through gratitude and unleashing power through creativity.

The dramatically powerful technologies of Wall Street, Silicon Valley, and Industry 4.0 have provoked, in effect, a worldwide economic revolution, starting in the 1970s, challenging the equally powerful technologies of the automobiles, and mass production.

During the golden age of mass production, in the 1950s and the early 1960s, the interests of business and society converged. Government support for education and health services freed up discretionary cash for people to spend on consumer products. High demand for these products created conditions for growth and profit. It was a robust positive-sum game, a super win–win between business and the majority of the population, resulting in good profits and decent livelihoods.

Then, in the 1970s, the mass production revolution hit a maturity ceiling. New products were less viable; productivity fell; markets were saturated. The welfare state became unsustainable, and national solidarity broke down.

Since then, many businesses have seen their cost advantage and their customer demand migrate abroad, away from their home countries. Low salaries no longer harm business as in the past, so living standards have been declining for decades. This, together with unemployment from offshoring, goes far in explaining the Brexit referendum and the fervor of the US elections in 2016.

The same technology could still lead to an open economy, where the means of production are more distributed. We would then see, for example, decentralization in energy, with micro-production of power, maybe blockchain-based micro-transactions for energy trades, crowdsourced finance, 3D printing, and more innovative means of local food production.

The last time a period of crisis ended, after World War II, there was a concerted effort by many government and business leaders to create a unified, prosperous, long-lasting recovery. The Marshall Plan, the Bretton Woods Agreement, the conversion of wartime industries to peace, and the rebuilding of Europe and Japan all played a role. Unfortunately, today's leaders haven't yet taken on the role they played at this point in past surges. Their stepping up last time was a catalyst for ending the crisis.

We may be in the midst of a great surge of technological and economic change since the Industrial Revolution. The last one, the age of oil, automobiles, and mass production, lasted most of the 20th century and still shapes many people's attitudes. Our current surge started around 1970 and has rolled out information and communications technology (ICT) around the world: It is the age of the computer and the Internet.

Even after 40 years, the ICT revolution is far from complete. It hasn't fully changed our way of life, as previous technological revolutions had done. It has brought a dangerous political shift, the separation of the interests of major global corporations from the interests of the national societies where they are based.

It may be useful to have a general look at the history of computer revolution to see how long it took for industries to be transformed via means of software: Since the invention of the microprocessor four decades have passed. It has been more than two decades since the peak of the 1990s dot-com bubble. The number of broadband Internet users is almost two billion. Given these Internet-based services, new global startups empowered by software could be launched easily in various industries without an investment in new infrastructure and training of new employees, necessarily.

Many of these Silicon Valley-style entrepreneurial technology companies already started to disrupt existing economies. Given the low-level cost of

startup development, it would be no surprise that the global economy would become mostly, if not completely, digitally wired for the first time in history.

A factor that may intensify those tensions is the nature of today's technology. We have an amazing arsenal of innovations on the threshold of realization: synthetic biology, quantum computing, blockchain, drones, autonomous vehicles, and private-citizen space travel.

Potential breakthroughs are dangled before us. But as Kentaro Toyama, the former Microsoft research director, asserts, technology should not be seen as the response to the problems of our civilization as rather than substituting for deficiencies, information technology amplified the capacity and intent stakeholders.

The key question is the intent with which we deploy this new arsenal of technologies. In a capitalist economy, there are two critical issues:

- Does an endeavor aim to increase productivity, and thus create wealth?
- Does it then aim to distribute that wealth among many, rather than concentrate it among few?

The Qur'an talks about wealth in the following three ways:

- Hoarding of wealth, which is condemned,
- Sharing of wealth, which is encouraged,
- Creation of wealth, which is often ignored and misunderstood.

Using the metaphor of mining let me mention three "goldmines" that I have sought to dig into by writing this book.

- The Qur'anic goldmine: As God created a world that flourishes within diversity and abundance, He also created human beings to both create products and services for the common good and serve Him and His creation. In short, service is a God-given gift.
- The historical goldmine leading to transformation is not new: Individuals and nations can be lifted out of poverty through means of wealth creation which can eventually result in a holistic transformation. This kind of history needs to be further explored.
- The global goldmine: Wealth creation is not a Western or rich-world phenomenon. Many men and women are making a difference through businesses on all continents. Wealth creators should also be enabled to provide service among other peoples and nations in the marketplace. We need to learn from them and others and to extract the global gold.

Despite the universal call to generosity and contentment, material simplicity is a personal choice. As the aim of wealth generation through business goes

beyond giving generously, good business can become an agent of positive transformation within the society given its intrinsic value as a means of material provision. As God commands in the Qur'an:

> *"O Ye who believe! Eat not up your property among yourselves unduly. Let it be trade amongst you by mutual agreement."*

As Islam does not approve of a life of asceticism and abstinence, it encourages the undertaking of economic activities to a great extent. Wealth is classified as being among a blessing of the Creator and seeking wealth in a proper way is even considered by some schools of thought as an act of worship. Wealth creation is a godly gift. Various material blessings can and should result from its proper use and be beneficial to the greater community. Businesses can contribute to positive, holistic, and redemptive purposes. Business provides not only a unique capacity to develop some financial capital, but also the ability to develop different kinds of wealth for many stakeholders, including social, intellectual, spiritual, and physical wealth. However, the issue of wealth creation is too often neglected or misunderstood. One major stumbling block is the sacred/secular divide. We need to see that God's concerns are holistic, and so is the mission of the mosque. The lack of business experience and exposure to business among imams and the lack of relevant teaching on wealth creation are among the reasons that so many Muslims hear little teaching, preaching, or discussion in the mosque about the activities that engage the greatest proportion of their time in between times of worship – that is, their daily work. Other reasons include the perceptions of corruption in the business world and the lack of visible structures for commissioning and sending. Some steps can be taken to address these obstacles and to engage the mosque in equipping business people to serve in the marketplace:

1. *Enlighten*: To create awareness through conferences and other means.
2. *Educate*: To accomplish a shift in the minds of people from interest to commitment.
3. *Equip*: To serve as a boot camp for aspiring individuals to become missional entrepreneurs.'
4. *Empower*: To design a roadmap for action.

The Mosque can and should be a part of helping individuals, communities, and economic and social structures work toward a state of comprehensive flourishing, with the elimination of both economic and spiritual poverty, to the glory of God.

> *"O you who have believed, indeed many of the scholars and the monks devour the wealth of people unjustly and avert [them] from the way of Allah. And those who hoard gold and silver and spend it not in the way of Allah – give them tidings of a painful punishment." (9:34)*

In the Qur'an, God is described as the ultimate source of wealth, even when that wealth is produced through the economic activities of individuals. But just as often God is described as one who expresses his judgment in stripping wealth away. God is the author of both wealth creation and wealth destruction as mentioned in the following verse:

> *"and to whom I have granted resources vast," – 74:12*

Even though God is the giver of wealth, human agency plays a part – whether good, bad, or neutral in a moral sense. Sometimes, wealth may arise through wisdom and understanding and sometimes through skill in trading. But sometimes wealth can be amassed through immoral means such as the oppression of the poor, collection of exorbitant interest, or injustice. There are additional kinds of wealth as well as poverty, beyond the material. In addition to the physical and financial abundance, the Qur'an also refers to God's blessings, in examples of generosity, and in warnings against greed and against misdirection of the heart.

Wealth creation basically refers to economic activities that generate profit, that increase income, that create jobs, and that enhance material well-being, so that people (and those who are employed by them) are lifted from poverty, and able to flourish. Yet, we also have in view God's goals for holistic well-being which goes far beyond "peace" in the sense of the absence of conflict, but which describes a state of comprehensive well-being – economic, psychological, ecological, relational, and spiritual. As businesses can contribute to these positive and holistic purposes, they can and should assess their activities in terms of a fourfold bottom line – financial, social, spiritual, and environmental.

The new technology giants, like Google, Facebook, and Apple, along with others developing robotics and similar technologies, will presumably comprise the highest productivity sectors. Yet, they won't lead us to a more decent society unless they encourage distribution. Otherwise, they are unacceptable monopolies. It's not just redistributing income that's needed, but also fostering multiple novel job-creating activities, which historically have been associated with changes in lifestyles.

Given the rapid rise of RFID tags, DNA profiling and analysis technology, national identification cards or identity theft techniques, and, needless to say our own identities should be closely protected. We need to ponder more in-depth on how much of individual lives should interact with the Internet which should only be conceptualized and put into use within that regard rather than being seen as the only source of social interaction or entertainment.

In the post-industrial Information age, the interaction of culture and religion focused especially on new forms of technology and communication which raised important issues for the ways in which Muslims communicate with each other and with non-Muslims.

The basic question also gave rise to other concerns such as how the Islamic message will be affected by the new media or whether and how Islamic discourse may be affected by a spirit of divisiveness.

The Creator can be glorified in the new media. The way of engagement is in appropriate alignment with the divine instruction. Some simple rules that should be taken into account for a theological ethic for Internet discourse can be summarized as follows:

- The "theology" part: At its most basic level, theology refers to the language about God; therefore, when speaking about God, in an academic or popular way on the Internet, one is "doing" theology.
- The "discourse" part: This concerns the interpersonal communication which avoids one from lying, slander, and the like, while actively advancing our neighbor's good name.

Similarly, in the digital realm, the following elements should constitute a dialog: charity, civility, and humility. We need to continue our conversations with fellow Muslims and non-believers in a way that is oriented toward loving them for the sake of the Creator.

This should not mean that our disagreements should cease in favor of a post-modern "Can't we all just get along?" mentality or that we should simply try to "win" the dispute. Rather, what it means is that despite the sharp level of disagreements, rhetorical techniques that aim to reconcile the dignity of the other person should be used. Allowing nothing but God's Word to stand between us, judging and helping, goes beyond the service of mercy as it is an ultimate offer of genuine community.

It should also be taken into account that a civil online discourse goes beyond niceness and mere etiquette as it requires also the dignity with which the other person is treated online. There can be both doctrinal clarity and a humble and generous discourse.

Despite having spent so much time on trying to promote civility within the digital realm, I still get a little nervous on this task as it takes constant effort not to err on one's side. I would hate to support the cause of a freewheeling sense of divine generosity that does not establish vigilance in defending the truth of the Qur'an. By contributing to the truth in love and civility within the digital realm in a digital age, we would realize that humility is a great way to encourage manifestation of these qualities, if we aim to continue our path to the truth in a digital age.