



# Proceedings of 2018 BAASANA International Conference at New York

July 30-August 1, 2018  
Newman Conference Center, New York

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Volume 9: 2018  
ISSN: 2471-6847

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***Published by***

**Business and Applied Sciences Academy of North America**

**2201 Bentley Drive, Bloomsburg, PA, USA**

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# BAASANA 2018 International Conference

## Internationalization and Success Factors in Family-Owned Enterprise: The Case of Sinokrot in Palestine

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### **Executive Summary**

The contributions of family-owned businesses to the economic growth of a nation are significant. These businesses are often regarded as the backbone of the economy (United Nations, 2004). In western countries, it is estimated that family-owned businesses represent more than 80% of all businesses, and they are the dominant form of enterprise (Bewayo, 2009). Moreover, family-owned businesses control more than 30% of the world's largest corporations (Bewayo, 2009). In the West Bank and Gaza areas of Palestine, family-owned businesses are represented in every sector. "The Palestinian economy contains about 104,000 economic units. Of the total, 91% are working in the private sector, 5% are functioning as government ministries and sub government units, and 2% are organized as NGOs, while about 1.4% are organized in local government units and United Nations Relief and Works Agency (UNRWA) for Palestine Refugees units." (Sabri, 2008). Serving as a source of employment and technological development, family-owned businesses are considered as a seedbed for industrialization (United Nations, 2004).

Palestinian businesses and operations are currently being confined and held back by the Israeli government. Nothing illustrates this economic confinement better than the fact that Palestinian economic trade with Israel is at \$4 billion which is three times higher than it is with the rest of the world. Implementations and new deals are required to change this factor for Palestinian economics (United Nations-DPI, 2016).

Enterprises in Palestine are always seeking to adhere to international environmental standards and quality assurance, as well as social ethics and labor norms, all of which are becoming significant determinants for companies seeking internationalization. Businesses in Palestine function under critical adverse conditions such as the Israeli closure policy, movement restrictions, checkpoints, and round-the-clock curfews. Palestinians are threatened with extreme poverty as a result of the construction of the separation wall (United Nations, 2004). Furthermore, the continuous punishing war in Gaza resulted in Israeli destruction of critical

Palestinian infrastructure, making commercial reconstruction almost impossible.

Although the Palestinian economy enjoyed substantial growth following the 1993-1994 Oslo Peace Accords between the Israelis and the Palestinians and the establishments of the Palestinian authority, this growth period masked deep-seeded structural imbalances and weaknesses inherited from the occupation period. These structural deficits include impoverished supply capacity, a high unemployment rate, a growing trade deficit, and an economy dominated by micro enterprises employing fewer than five persons (United Nations, 2004).

The United Nations recognizes that the growth of small companies is crucial for the future independent state of Palestine, especially under the current weak economy, distorted supply capacity, and the limited size of local markets (United Nations, 2004).

Palestine has constantly been dominated by different entities and is currently occupied by the state of Israel. The result has been diversification of the population and government. The majority of the Palestinian population is concentrated in the West Bank and Gaza areas. Palestinians dream of having their own independent state, but the current Israeli occupation of the West Bank and Gaza, and internal conflict between Fatah and Hamas—the two major political parties—have presented barriers to the realization of this dream (The Institute for Middle East Understanding, 2009).

Ranking Algorithms in Search Engines: Emphasis on  
Markov Chains and the Weighted link Matrix

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**Abstract:**

There exists a wealth of information regarding ranking algorithms and search engines. The rated importance of web pages is a significant factor on how links are presented. Analyzing the mathematics behind the most popular search engines involves linear algebra and directed graphs-transition matrices that complements the discussion of Markov chains in matrix algebra. Recently, Markov chains have earned a new interest in the field of Search Engine Optimization (SEO) due to the successful applications in the area of web search. In particular, Google's PageRank algorithm which is based on a Markov chain obtained from a variant of a random walk. With the enormous quantity of pages on the World-Wide-Web, many searches end up with numerous results. If these results are not properly ordered, all this information is useless unless we have a way of searching and sorting it. In this article, recent applications to the area of search engines, namely, the PageRank algorithm employed at Google, is discussed.

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Management of Internal Information in Businesses for Organizational Effectiveness

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**Abstract**

Businesses need to take steps for effective management of information to leverage for organizational effectiveness. This paper reviews information support services in the business sector focusing on management of internal information in selected business organizations in different sectors of economy in Kuwait. Data for this paper was collected from top companies in different sectors of economy through a web-based questionnaire. Most business organizations appear to be aware of the importance of information and need for its effective management. The business organizations perceive that records management and document management functions are essential for capturing, storing, organizing, and sharing internal information. They also appeared to be appreciative of the role of institutional repositories and enterprise portals in effective information management. Business organizations prefer that information is managed in relevant departments and responsibilities for overseeing the information management are assigned to senior level officers. Information management work, however, does not appear to be considered an organization-wide function.

**Introduction**

The ability to manage information effectively can help make the right decisions and achieve company objectives and its timely availability to employees will help achieve company targets. Businesses need to take steps for effective management of internal information to leverage for organizational effectiveness. Arnold (2010) and Brahem (2013) reported that businesses face numerous challenges in managing information. These include disparate information systems, little system integration, poor quality of information content, lack of corporate-wide taxonomy to categorize information, and lack of clarity in organizational

strategies and directions for defining information. Proper mechanisms (systems, plans, policies and procedures) need to be put in place to facilitate recording, managing, and making available internal information to relevant stakeholders. Effective information management is helpful to improve the efficiency of business processes, meet the demands of compliance regulations, and fulfill the desire to deliver new services.

The systems and functions that are frequently referred to in the context of management of internal information include archives & records management, document management, content management, enterprise content management, web content management, and management of digital assets. While there can be slight differences in these systems/functions, increasingly in the digital operating environment the lines between them are blurred. Mostly an integrated approach to the management of digital information assets is more appropriate regardless of how it is produced and what form it takes.

Greenwood (2012) reflected on information and records management and pointed to a number of major shifts in this area. Records managers are being asked to host information systems, manage digital information, preserve paper records and make sure appropriate security standards are in place with retention policies adhered to. It is obvious that information managers sit down with senior management in the company and information services suppliers to address emerging issues, such as the risk and impact of a data breach and steps desired to be taken.

Several guidelines for information management in organizations are available in the professional literature. Notable among these are: records management best practices guide by Mountain (2005); information management strategy by In-form Consult (2005); best practices guide in information management by Thales. (2013); theoretical framework for information management in SMEs by Namisango and Lubega (2014); enterprise information management readiness in small companies by Hausmann, Williams, Schubert (2014); records and information management practices among SMEs by Okello-Obura and Muzaki (2015); and corporate information management framework by Bannister (2016). The guidelines reviewed helped prepare the data collection instrument and also to develop a conceptual framework to guide the study. A summary of guidelines also provided a framework for the conduct of study information management practices. Figure 1 shows main components of the conceptual framework for management of internal information.

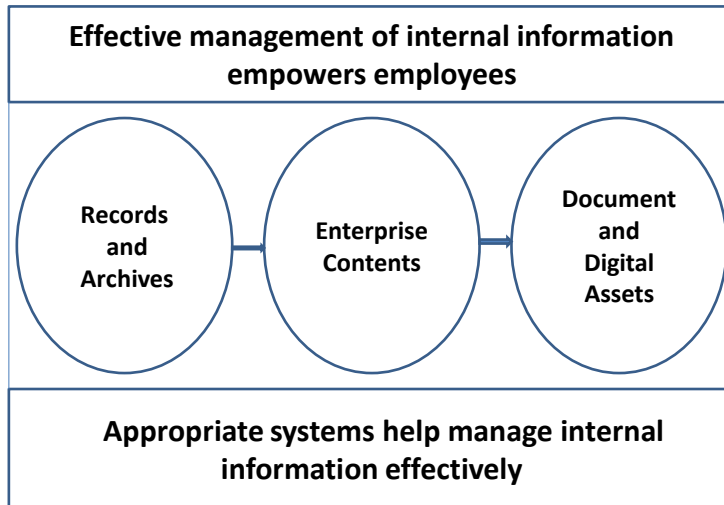


Figure 1: Conceptual Framework for Information Management

Effective management of internal information empowers employees of an organization. With appropriate mechanism and systems in place, employees in business organizations are able to exploit information resources irrespective of its location or format for decision making problem solving.

- It is important to realize that information management is much more than just technology.
- IM is about the business processes and practices and the creation and use of information.
- IM should focus on people, process, technology, and content.
- There is a need to pay attention to information architecture, metadata, and content quality.

### Focus of the Paper

This paper reviews information support services in the business sector focusing on information management practices in selected business organizations in different sectors of economy in Kuwait. It is aimed at reviewing the document & content management or enterprise information systems, institutional repositories, organizational websites, corporate intranets, enterprise portals and relevant information policies.

- The paper focuses on the following areas of information management:
- Perceptions about information management functions
- Strategies for managing enterprise content in businesses
- Assignment of responsibilities for information management work

### Data Collection

One hundred and thirty top companies were selected from the list of Boursa Kuwait. These companies were invited to participate in the study through email. Email messages were sent to units that were considered relevant to information work. These included information

system or center departments, corporate or business planning and development units, information technology and other similar units. They were asked to fill up an online questionnaire about information management practices in their companies. They were also requested that if some functions were not relevant to their unit, the request for provision of information may be forwarded to the relevant section. It was explained that one consolidated response was expected for each responding company. Initially, it appeared pretty difficult to obtain information from the business organizations but some follow up phone calls and email messages helped identify relevant sections and employees to seek information about the company. Initial data collection exercise yielded information about 27 companies. Follow up with non-respondents helped increase the number to 75. The online questionnaire covered information support services that address two areas: access to external information and management of internal information

## Findings

### Respondent Profile

Out of the 75 companies that participated in the study, 16 requested not to disclose their identity. They did not supply details about name, area of business, and contact details. They thought it was necessary because of the competitiveness. The other 59 companies belong to seven different sectors: petroleum and chemicals (16), banking and finance (15), retail trading (9) investment 6), telecommunication (5), construction and engineering (4), and real estate (4).

### Perceptions about Information Management Functions

Respondents work asked important are different information functions for their companies. Functions preferred by respondents are given in Table 1.

Table 1: Perceptions about Information Management Functions

N=75

Rank	Function and feature	Median	Mean	Standard Deviation
1	Record management (keeping records for long time use).	5.0	4.32	0.95
2	Archiving (saving and keeping content for preservation).	5.0	4.22	1.12
3	Document management (processes used to track, store, and control documents).	5.0	4.20	1.03
4	Content management (administration - creation & editing - of digital content).	5.0	4.14	1.10



5	Web sites (creation, review and publishing of web-based content and content re-use management).	4.0	4.05	1.12
6	Enterprise portals (online site for a single gateway to company information and knowledge).	4.0	4.04	1.03
7	Institutional repositories (storage of aggregate data with ability to extract data selectively).	4.0	3.99	1.11

Respondents from leading business organizations reported that the following functions were important for managing information:

- Records management
- Document management
- Web Archiving
- Institutional repositories

Record management focused on keeping documents for long time use because of regulation of business practices. They reported that document management was being used for storage of aggregate data with ability to extract data selectively. Web archiving and managing institutional repositories were also considered important for managing information. Archiving was done for saving and keeping content for preservation and institutional repositories focused on storage of e-content. Surprisingly, websites, enterprise portals and content management systems were considered less important comparing with the functions mentioned earlier.

Businesses reported that web sites were being used for creation, review and publishing of web-based content. Enterprise portals were used as online site for a single gateway to access company information. Knowledge and content management focused more on administration, creation, and editing of digital content.

**Information Management Strategies**

Preferences about information management strategies as indicated by respondents are listed in Table 2.

Table 2: Preferred Information Management Strategies N=75

Rank	Strategies	% of responses
1	Information is managed in relevant units using database management or specialized applications.	46.58
2	An integrated system is in place that receives information from relevant units and makes available as and when needed to relevant sections or staff.	17.81
3	Information is managed in relevant functional units and made available through company website or enterprise portal.	15.07
4	Others	10.96
5	An enterprise-wide content management system is used to manage documents, records and other digital assets. (3)	9.59

The companies that provide information on information management practices belong to different sectors of economy. Because of the nature of business and the diversity of activities, these companies reported a great deal of variety of approaches adopted for managing information. A summary of their responses is given below:

- Database management systems are used to manage information in relevant units
- Integrated systems are in place to receives information from relevant units and make it available as and when needed to relevant sections
- Information is managed in relevant departments and made available through company website or enterprise portal
- Documents, records, and digital assets are managed through an enterprise-wide content management system

### **Supervision of Information Management Functions**

In addition to the nature of business, size and quantum of work also varied in the companies participated in the first phase of the project. Participants were asked how information management activities in their organizations are grouped or structured and who oversees the information work. Their responses are summarized in Table 3.

Table 3: Information Management Supervision Functions  
N=75

Rank	Strategies	% of responses
1	A senior level officer is assigned to oversee the information access and management functions.	45.45
2	Information access and management responsibilities are assigned to relevant existing departments.	22.73
3	Information professionals/specialists are assigned to perform information support work in functional areas.	21.21
4	Others	10.61

- As shown in Table 3, their preferences can be summarized as under:
- Supervision of information management is assigned to a senior level officer
- Information management responsibilities are handled by department managers
- Supervisors of functional unites are responsible for managing information

In majority of businesses information management work was overseen by a Chief Technology Officer. This indicates that information management work is perceived related to technology and there is less emphasis on the content. At the department level, the officers responsible for information management were specialists, e.g., archivists, records managers, documentation officers, contents managers or web developers. This indicates that business organizations mainly perceive information management relevant to web and other online sites. Information management does not appear to be perceived as an organization-wide responsibility. In most businesses, Information Technology or Information System Unit was responsible for information management work.

**Conclusions and Recommendations**

No study about information management in Kuwaiti companies could be located from relevant professional literature. This study will help gather best practices for managing internal information by leading companies. The compilation of best practices will be a useful source for decision makers for formulating guidelines for information support in local and regional companies. In addition, these compilations will be a good source for teaching courses related to business information.

Most business organizations appear to be aware of the importance of information and need for its effective management. The business organizations perceive that records management and document management functions are essential for capturing, storing, organizing, and sharing internal information. They also appeared to be appreciative of the role of institutional repositories and enterprise portals in effective information management. Business

organizations prefer that information is managed in relevant departments and the need for integrated information management system is considered as a second option. Business preferred to assign responsibilities for overseeing the information management to senior level officers. Some assigned information management work to IT professionals and information specialists. Information management work, however, was not considered an organization-wide function. To gain more insights into the information management strategies, it is desirable that future studies use more rigor research methods such as interviews and focus group discussions.

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**STUDENT MOTIVATION IN ONLINE LEARNING**

*Christina Chung*

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**Abstract:**

Within an education context, motivation has been studied to find ways to increase students' involvement in a learning situation. Previous studies have shown the importance of motivation as a determining factor in students' learning processes. The purpose of this study is to examine the factors that affect student motivation in online learning. To investigate the factors that affect student motivation in online learning, competence and intrinsic motivation from Self Determination Theory (SDT) and perceived ease of use and perceived usefulness from Technology Acceptance Model (TAM) were examined. Intrinsic motivation is the most self-determined form of behavior and involves engaging in learning opportunities because they are seen as enjoyable, interesting, or relevant to one's psychological needs. As a result, intrinsic motivation is associated with a high level of effort and task performance. Students with greater levels of intrinsic motivation demonstrate a strong learning desire, high academic achievement, and strong persistence. Thus, intrinsic motivation is a powerful factor in learning and leading to high productivity. Two constructs, perceived usefulness and perceived ease of use, measure the degree of an individual's system usage and perceptions in examining behavioral intention and actual use. Perceived usefulness (PU) is the extent to which applications contribute in improving user performance. Perceived ease of use (PEOU) refers to the degree of required effort in taking advantage of the application. The findings explained there are significant relationships between all constructs. The results imply that competence and intrinsic motivation are strongly related to goal orientation. Also, the goal orientation with perceived ease of use, and perceived usefulness affects positively to behavioral intention.

**Disruptive Innovation of Online Learning**

**Tung Cu, Amin Ruhul**

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**Abstract**

Higher education (HE) is entering a turning point, as there are predictions that over half of U.S. universities will fail within fifteen years due to disruptive innovations of massive open online courses (MOOCs). Will these open learning innovations change how we teach in the future? The purpose of this paper is to examine the MOOC provision in the context of Vietnamese higher education and propose new business models that integrate MOOC platforms into institutions to meet changing demands of the education market.

To address observed gaps in online learning innovation research, this study engages in the theory of disruptive innovation extended to a public sector and on a national scale. According to the theory, a disruptive innovation may initially lack certain features or capabilities and only appeals to underserved learners. However, eventually, the innovative learning service with a higher performance trajectory outperforms the existing learning service to attract mainstream learners and completely redefines the HE industry.

To validate the proposed research idea, we carry out a data-driven and confirmation comparative case study on a national scale. We found that the reason for discrepancies in previous studies is that they failed to identify sophisticate conditions: necessary and sufficient to articulate a radical innovation. We argue that breakthrough technologies such as Artificial Intelligence and Internet of Things can help “Teleducation”, MOOCs in particular, play a disruptive role to change the process of higher education significantly and that the theory of disruptive innovation is applicable on a national scale. However, the pattern of radical changes does not exactly follow the theory of disruptive innovation. Disruptive education is likely scalable, but under some necessary and sufficient conditions. We also propose higher education policies and new business models for traditional universities to cope with future challenges and gain competitive advantages in the global education market.

**Keywords:** Disruptive Innovation, MOOC, Higher Education, Teleducation

**A Review of Concentrated Solar Power Systems and Technologies**

**\*<sup>1</sup>Brandon Van Gennip,<sup>2</sup>Eric Goodwill, and <sup>3</sup>Kala Meah,**  
York College of Pennsylvania

**Abstract**

The scientific community has been scrambling to find new power solutions that are practical, cost effective, reliable, and sustainable. One of these emerging technologies is the use of Concentrated Solar Power (CSP). CSP is very appealing due to its ability to utilize unwanted desert areas, its use of solar rays making it a renewable energy source, and its practical design that is similar to various steam plants. CSP has many technical challenges that still need to be resolved such as connectivity to the grid and high implementation cost; however, CSP excels in energy storage and environmental impact when compared to fossil fuels. In this article, CSP will be evaluated on its social, economic, technical, and environmental aspects. A breakdown of CSP into its four system types will be done, and a comparison to competing technologies such as Concentrated Photovoltaic (CPV) and fossil fuels will be given. Finally, an estimated timeline of CSP history and future development will be given based on historic events and projected development.

**INTRODUCTION**

Today's societies are dominated by electronic operations: from medicine to entertainment, communication to transportation, electronics have become standardized in daily life. As society becomes more computerized, it requires larger amount of power to support its infrastructure. Concentrated Solar Power, better known as CSP, is a relatively new concept in the Power industry. The system relies on using arrays of mirrors to reflect and concentrate the sun's light onto receivers. These receivers are tubes carrying a transfer fluid that is heated and then fed into either a turbine where the mechanical motion is translated into electricity, or a storage tank where then heat is "stored" for later translation. There are several forms of CSP, the main four are as follows: Linear Concentrator Systems, Dish/Engine Systems, Power Tower Systems, and Thermal Storage Systems. CSP has been given a lot of attention due to its promising outlook. Since 2011, the Levelized Cost of Electricity (LCOE) for CSP in in the US alone has dropped from \$0.21 per KWh to \$0.12 per KWh. CSP's versatile nature allows it to be used in multiple scenarios and in combination with other power systems such as natural gas "Peaker" plant, a standalone CSP power plant, a backup energy storage plant, or a base load source of electricity for classic nuclear and coal plants [1].

CSP is also a favorite amongst environmentalists due to its clean power generation. Some projects plan to implement CSP environmental friendly aspects into other power plants; proposed fossil-fuel backup/hybrid plants would allow existing fossil fuels plants to maintain their productivity while limiting emissions. This has the potential to make a large portion of the power industry cleaner while running at the same, or in some cases, lower operational cost [1]. CSP attention is global, and several countries are seeing the potential of these technologies. In Brazil alone 5 major CSP projects have been launched across the country. Several other countries with high sun exposure such as Bangladesh, Egypt, and Australia are also realizing the CSP can be used to limit dependence on fossil fuels as an industry. Such actions have far reaching economic and political impacts in countries such as Saudi Arabia, one of the world's top petroleum producers, who has begun to shift away from an all-oil economy and into a hybrid power infrastructure [2]. It is clear that CSP has the potential to revolutionize societies and industries across the globe via numerous methods for implementation as either main or sub power systems. As more research and development is done in this field, the Power industry takes its first steps into the future.

**MODERN DEVELOPMENT**

CSP had a hard time gaining traction in the earlier years because of how cheap oil and fossil fuels were. They were so cheap and so effective that America was importing more fossil fuels than it could use [3]. This made CSP very unpopular at first due to high implementation costs and lower power output. CSP also uses up a massive amount of land in order to provide enough power. This makes creating a CSP plant a very lengthy process because of the building permits for the land use. To combat this, a dish like CSP plant is built to shrink the CSP plant. This dish plant is similar to the first CSP technology built and produces kW instead of MW.

In the 2010s, president Obama pushed for a green energy grid and put billions of dollars into the power grid. By 2014 the largest solar field called “Ivanpah” was built in California. Ivanpah can produce up to 392 MW of clean energy. Ivanpah costed a total of \$2.18 billion and about half of the project was funded by the government [3].

Future projects include European countries using North African land in order to build large scale CSP plants to provide power to their homes [4]. Also different chemicals used instead of molten salt are in research like ammonia that can use a chemical reaction to provide power instead of heating up water pipes [5].

The modern American grid has approximately 1.8 GW of Power from CSP plants connected to the grid, with over 767 MW from Ivanpah, Genesis Solar’s Second Phase, and Abengoa Mojave Solar which all came online in 2014. The SolarReserve 110 MW Crescent Dunes plant came online in 2015, and is the largest commercial molten salt power tower in the global market. The most prominent CSP plants in America are Mojave (250 MWe), Solana (250 MWe), Genesis (250 MWe) and Ivanpah (392 MWe). From the monthly production data in 2015-2106, generation from these sites represents less than 1% of the consumed electricity in Arizona, Nevada, and Southern California. However, for that time period this still represents 1363 GWh generated by Solana, 1355 GWh generated by Ivanpah, 1128 GWh generated by Mojave, and 1246 GWh generated by Genesis. All this generation occurred in areas well above the Equator, where exposure is maximized and much more constant. In addition, these situations may be reproducible, as there is unutilized space with similar Direct Normal Irradiance (DNI) rates as seen in Figure (1)

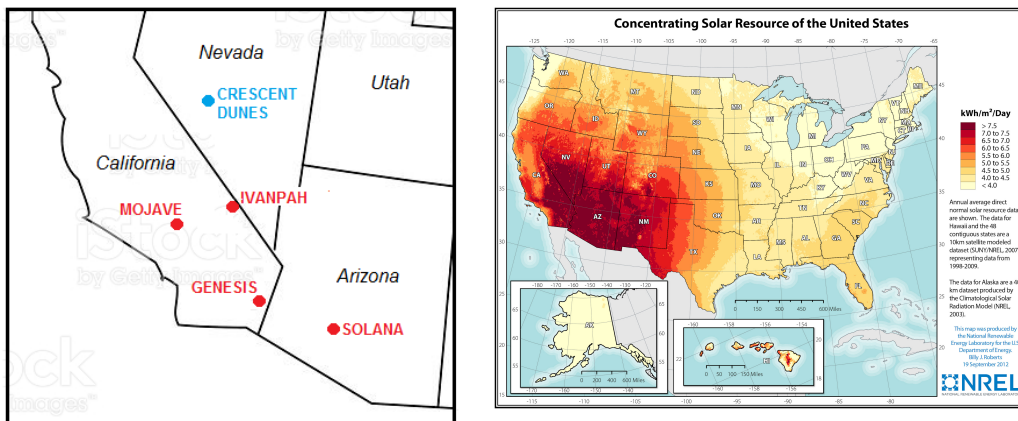


Fig 1. CSP plant locations [6] vs DNI solar map data for similar plant sites [7]

Given the current Rangeland available in Arizona, California, Nevada, and New Mexico, a potential 26,000 to 54,000 sites the size of the Solana plant can be opened, yielding a max potential Generation of 0.65 Gwe to 1.35 GWe to [8]. While complete overhaul of existing Power system in USA may not be plausible, it is clear that CSP based systems and CSP subsystems may help contribute to a greener US economy.



### LINEAR CONCENTRATOR SYSTEMS

Linear concentrator systems are the most common CSP technologies and consist of a trough of mirrors that have a water pipe running through each trough. The water pipe is heated up to produce steam which turns a turbine. These systems can consist of many troughs with smaller pipes in order to produce steam quicker than other CSP systems [9]. Troughs are generally more compact than other systems. A basic overview of the system can be shown in Figure (2).

The parabolic troughs need to track the sun throughout the day and use a pipe at the focal pipe of the mirrors. Many countries including Spain and the USA have adopted this method of CSP. Currently the USA has 9 plants that contribute 439 MW to the total grid [10]. Parabolic troughs are cheaper to build due to their compact size compared to power tower systems.

With CSP troughs, flow rate is very important in gaining the maximum amount of steam produced. Through extensive research, it has been discovered that lower flow rates actually result in higher collector efficiency. Because solar intensity varies throughout the day, the efficiency also fluctuates as a function of time.

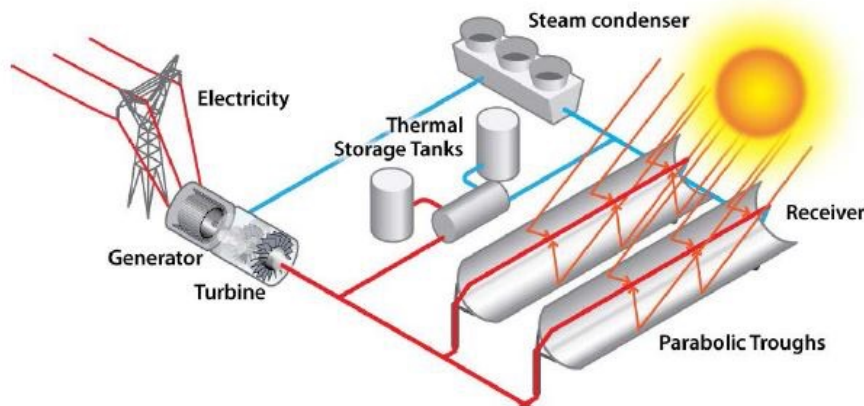


Fig 2. Concept Linear Concentrator Systems [1]

### DISH/ENGINE SYSTEMS

A CSP dish looks very similar to a satellite dish except that it directs sunlight onto a collector that generates heat. This collector is usually some sort of gas like helium that transfers heat. The heated gas transfers heat to a fluid which than is used to move pistons to create electrical energy. In order to create the mechanical energy, a sterling engine is used. A sterling engine is basically an engine with pistons that move based off of expanding (heated) gas and compressing (cooling) gas [1]. Figure (3) shows an example of a dish system. Dish systems are a lot more compact that power tower and trough systems. Another unique thing about a dish system is gas can be used to generate electricity through a sterling engine which would decrease water consumption in areas like the California [11]. A dish system was also the very first form of CSP which was used to power a sterling engine for machines. A downside of a dish system is there is not much potential for a large amount of power output due to the small size. A dish system has a storage system in order to make it more efficient but is used for more of a smaller area used primary for places that do not have a high energy demand.

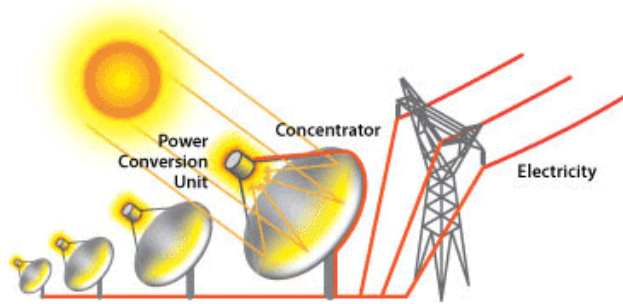


Fig 3. Concept of a Dish System [1]

### POWER TOWERS SYSTEMS

Power Towers are similar to linear concentrators in that they utilize a massive field of Heliostats to track and focus sunlight on receivers. In the case of Power towers, point focusing, directing rays to a central point, is used to concentrated solar rays onto a singular receiving tube at the top of the tower. A basic concept art can be seen below in Figure (4)

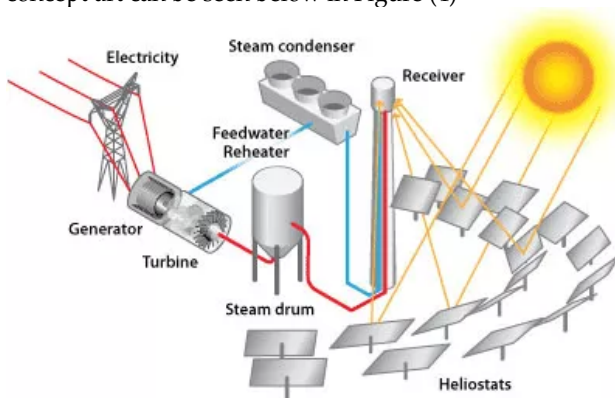


Fig 4. Concept art of Power Tower operation [1]

Several Power towers are in operation in Spain, the most notable are Solar 10 and Solar 20 which have an 11MW and 20 MW capacity respectively. One of the largest Power Tower Projects is Ivanpah, which uses a system of 173,500 Heliostats with 2 mirrors to concentrated rays on a set of 3 Power Towers. This project is currently the largest of its kind in the United States, and is capable of outputting 392 MW [1]. Newer projects have been experimenting with molten salt as a transfer material to replace water as a more heat efficient material. From an optical and thermal perspective, some of the Power Tower's greatest advantages are in its physical design. Power Towers have a height advantage that allow for high performance during winter seasons, and allow for optimization of Heliostat placement due to the singular receiver. The systems also tend to be more efficient in terms of heat transfer due to molten salts ability to operate at higher temperatures, thus making Power Towers ideal for energy storage and use as supplementary power systems [12].

In Algeria, an ongoing case study for CSP technologies examines the feasibility of CSP Power Towers in the cities of Tamanrasset, Bechar, and Algiers and compare it to the existing Power Tower in Daggett, California called Solar One [13]. The study concluded that site replication at Bechar and Tamanrasset could match that of the USA Daggett site, which output about 20 GW/year. While areas near Algiers yielded poor production, areas similar to Bechar and Tamanrasset, such as Taghit, Ghardaia, Reggane, and other cities in Southern Algeria could produce similar plant results. This opens up major possibilities for the mostly open desert region of Southern Algeria to become a booming CSP market.

**THERMAL STORAGE SYSTEMS**

Thermal Energy Storage (TES) systems is one of the most exciting aspects of the CSP systems. Unlike the other systems, TES focuses more on energy regulation and conservation rather than the methods of energy collection and translation. The most common method of TES is Two-Tank storage in which a transfer fluid (water, oil, or molten salt) is used to either syphon off or introduce heat into the energy generating portion of the system [14]. Two tanks are used to store heated and cooled transfer fluids in order to ensure energy is conserved for later use. Figure (5) shows a system flow diagram of this concept.

In Figure (7), the two tanks are connected by control lines that enter two separate heat transfer systems with the main plant. This system implementation allows the TES system to operate in two main modes, Charging and Discharging.

In the event that the plant produces too much energy, the transfer fluid is injected into the control lines from the cold tank. As the fluid passes through the charging heat transfer station, it passes by the transfer fluid in the main system that goes from the heating point to the turbine. As these two fluids enter, heat from the main system is transferred to the TES system, and then sent into the hot tank for later use. This is known as charging mode.

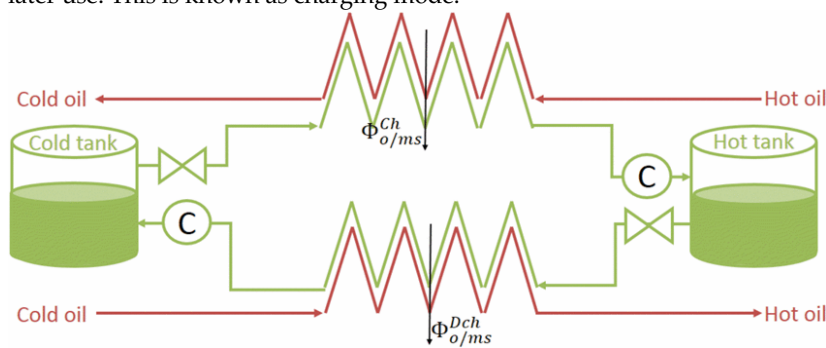


Fig 5. TES Two-tank system model [14]

In the event that the plant produces too little energy, the transfer fluid is injected into the control line from the hot tank. This time, the fluid passes through the discharging heat transfer station where it passes on its heat to the system line that goes from the Condenser to the heating point. The cooled transfer fluid in the TES line is then sent to the cool tank for later use. This is known as discharging mode.

From this two tank molten-salt transfer model, a controller was designed to regulate the enthalpy (total heat content) of TES and CSP heat transfer fluid (molten salt and oil respectively) based on the molten-salt mass flow rates into the charging and discharging heat transfer stations and the system physical parameters (tank liquid level, material density, fluid pressure, etc.). From this, the system transfer can be linearized around operating points that allow for optimum operation, monitoring, and performance evaluation. Figure (6) gives a sample output of the linear vs nonlinear operations of the simulated TES and CSP model.

From this, plants can control, predict, and record system output in real time via indirect active methods. This allows power systems engineers to have a method of determining the combined system enthalpy, which directly correlates to the system output power to the grid.

This type of power control is crucial, as the current grid in the United States is in serious disrepair. Lack of investment in Transmission technology has led to a gradual decline in the modern grids carrying capacity as shown in Figure (7).

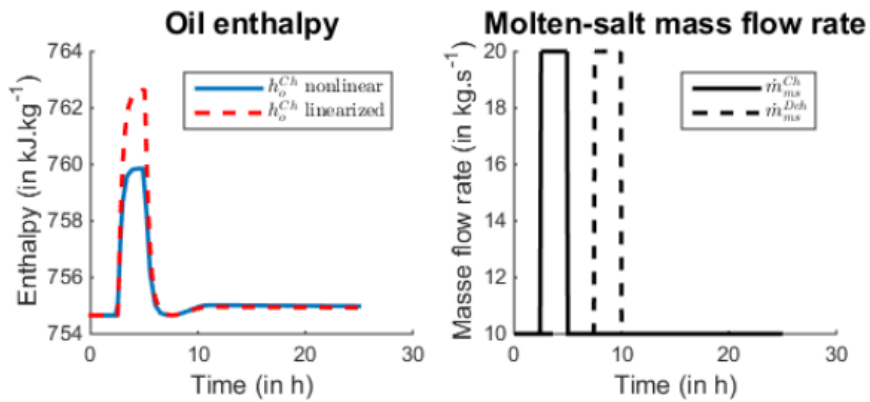


Fig 6. Linear and nonlinear tracking of charging heat transfer station oil enthalpy ( $h_o^{Ch}$ ) based on charging station mass flow rate ( $\dot{m}_{ms}^{Ch}$ ) and discharging station mass flow rate ( $\dot{m}_{ms}^{Dch}$ ) [14]

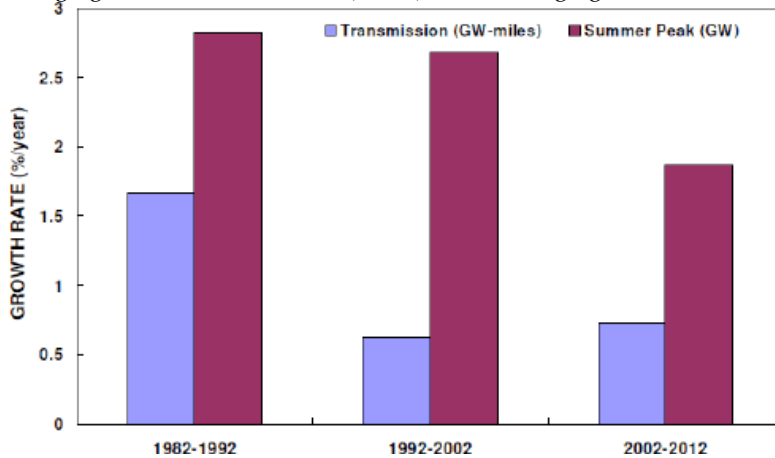


Fig 7. Annual average growth rates in U.S. transmission capacity and peak demand [15]

With TES, which is classified for long term hourly storage, CSP plants have the potential to provide stable and continuous power due to its low losses and cost effective storage which can supplement the lack of grid infrastructure growth. A sample output of the projected power output can be seen below in Figure (8)

### COMPETING TECHNOLOGIES

In the solar department, the main technology that CSP has to contend with is Concentrated Photovoltaic (CPV). Unlike CSP, CPV can convert light directly into electricity, making it more efficient. CPV also has lower installation cost, is smaller in scale, and are less sensitive to alignment errors than the concentrators used in CSP systems. Although CSP investment has increased significantly in recent years, CPV cost has been steadily declining due to more efficiency designs [16].

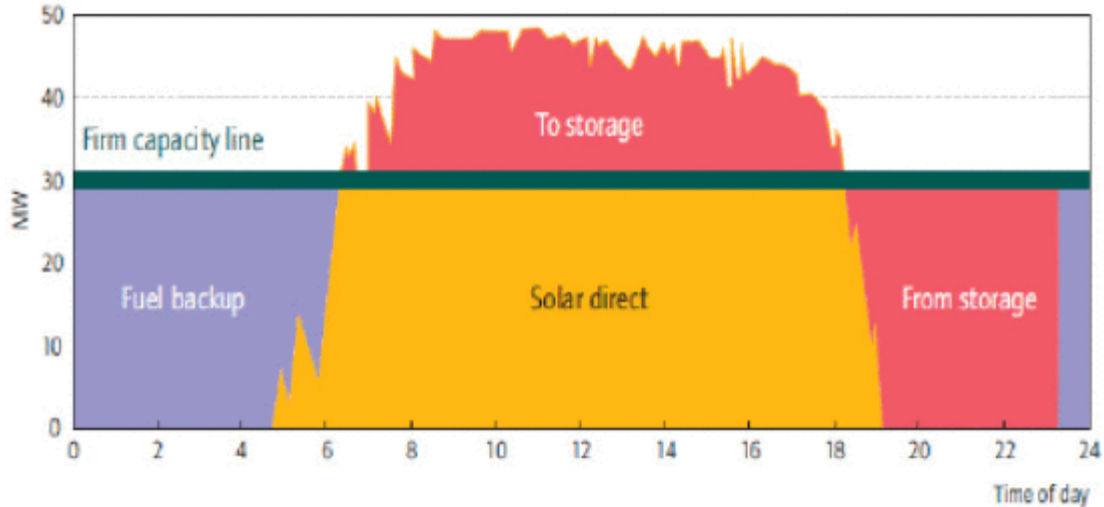


Fig 8. Output Power through CSP TES to meet grid demand [15]

The deciding factor for CPV and CSP is production optimization and cost. Case studies in Panaji and Dehradun were taken to verify the potential energy production on a monthly basis. Climate data for each location was taken to measure the effects of wind speeds, dew point and solar irradiation were taken into account, and a final graph of the production was taken. In almost all cases, CSP Production in kWh was higher than that of CPV despite the average day length in Panaji being shorter, thus needing more precise solar tracking. A second case study in Australia, this time implementing CSP-TES and photovoltaic storage system Electrical Energy Storage (CPV-EES), compared the Output Power in rural Queensland with CSP-TES connection service side and rooftop CPV-EES customer side against the base case. Table (1) gives the results of this case study given the two implementations

From here it can be seen that while customer end CPV-EES installation allows for flexibility and ease of implementation, the CSP-TES gives greater long term benefits in terms of OPEX. In addition, CSP and CPV systems are no longer mutually exclusive. Further investment and research in hybrid CSP-PV systems gives very favorable power generation systems. Hybrid systems are favorable as the controllability of CSP systems can stabilize the CPV system, as it tends to spike and violently fluctuate with variations in sunlight. Hybrid systems also allow for the access heat in the CPV system to be redirected into the CSP systems, thus increasing the efficiency of both systems. Hybrid systems also force the integration of both systems, and as they become more common, the CPV low prices would help drive the cost of CSP systems down. Several designs for CSP-PV systems have already been developed: the PV-Topping systems utilize the solar cells as both the converters and thermal receivers of the CSP system; the Spectral Beam Splitting (SBS) system uses beam splitting technology to direct only the usable wavelengths to the solar cells and use the remaining in the CSP system. In Chile, the Atacama I plant, a flat CSP-PV system, implements separate CSP and PV systems with options for heat transfers. The project consist of a 100 MW CPV field next to a 110 MW CSP power plant whose success in 2013 spawn development of Atacama II.

Table 1: CPV-EES and CSP-TES benefits against base case generation for 3 month period [17]

Case	Total generation cost (\$)	Avoided generation cost (\$)	Avoided generation cost unit of generated energy (\$/MWh)
Base Case	637,493,310	-	-
PV-EES	627,124,300	10,369,010	24.57
CSP-TES	626,352,001	11,141,309	26.53

Coal is extremely cheap compared to other energy producing methods. With the addition of CSP, coal can become a more efficient way to produce energy throughout the day. CSP has a very fast ramp up time compared to coal and nuclear. The ramp up time is described as the amount of time it takes to turn the plant on or shut it down. This allows for CSP to be used with coal in the existing grid in order to allow for a more efficient coal plant [18]. A hybrid coal and CSP plant is also not as efficient as the theory suggests. There has been a small benefit in carbon emissions by switching to a hybrid plant compared to using other methods like carbon capture which is a process where the carbon molecules produced from the plant are captured and moved to where they will not enter the atmosphere [19]. CSP also is not very effective on cloudy days or places where there are shorter days making the CSP portion of the hybrid plant useless however with the storage component of CSP and the fast ramp up time, a hybrid plant could react faster to load changes on the current grid. A hybrid plant, shown in Figure (9), demonstrates how CSP and coal work together.

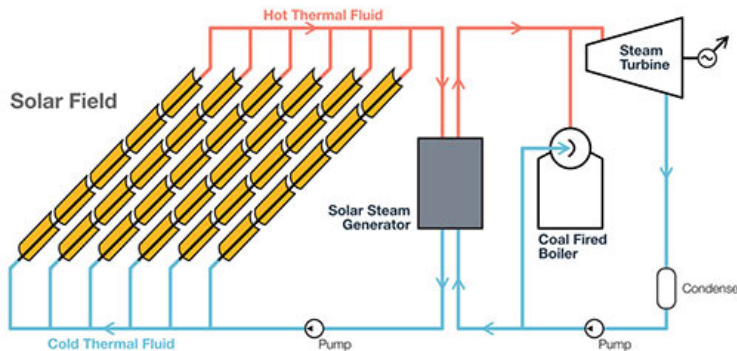


Fig 9. Diagram of a CSP and coal hybrid plant [18]

The CSP portion would heat up the cool water that is also connected to the coal fired boiler. These two parts would heat up the same pipe that would create steam to turn a turbine. This turbine would then spin a generator creating electricity [18]. Wind powered plants are similar to CSP by power output levels, but they are often having a higher cost of maintenance than CSP due to the moving parts of the system. Wind can be placed offshore in windy parts where CSP needs direct sunlight therefore wind usually has a higher flexibility in placement. However, CSP has a very easy to implement storage system and can be used as a hybrid portion in a coal fired plant. Wind powered plants do not use a steam turbine to produce energy like traditional power plants, therefore they cannot be used in tangent with a current coal or nuclear plant. Currently, wind is about half the cost of CSP per KW (\$4000/kW for CSP and \$2000/kW Wind) [20]. However in terms of energy penetration, the percent of electrical energy generated/consumed in a total system, Solar sources with energy storage far outclass wind power systems as seen in Table (2). Comparing the data in Table (2) further shows that CSP dominates both wind and PV in energy storage. This would cause more wind farms to be placed in order to keep a constant energy output [20].

Table 2: Comparative of capacitive values of wind, CSP, and PV [20]

Penetration level	Wind + CSP + PV	Wind only	CSP only	PV only
10% wind, 1% solar	15.8%	11.4%	92.6%	28.6%
20% wind, 3% solar	17.7%	10.8%	93.3%	26.9%
30% wind, 5% solar	18.5%	10.7%	92.2%	26.9%

**IMPACT**

CSP is not just revolutionary on the Power systems front, and its use touches various sects and aspects in society. In Europe the EU has legislated mandates for 20% reduction in greenhouse gas emission, 20% improvement in energy efficiency, and a 20% share if energy coming from renewable sources. One proposed method is to develop large CSP plants in North Africa and transmit the power to Europe via High Voltage Direct Current (HVDC) transmission lines. It was suggested that in practical implementation, North African countries would agree to build the plants, then implement a feed-in tariff to transmit the power to European countries in a manner similar to Spain’s current CSP agreements [4]. This type of agreement has the potential to help many European nations meet the EU deadlines while helping modernize Power industries in North Africa. However, there is still the chance of controversy. European companies could short change African companies, using their economic, social, and military influence to demand cheaper prices or impose cooperation with the proposal.

CSP has also touched the lives of the Western World. In the United States, the Ivanpah CSP Power Plant faced initial controversy for endangering wildlife. Insects, and the birds who prey upon them, were attracted to the bright lights of the plant and would often be harmed by the high intensity rays. Many Biologist have raised concerns, and the plant owners have been fast acting in order to protect wildlife from these unintended consequences [21]. Plant officials have outfitted the plant with non-lethal avian repellent, LED lights that attract less insects, and “road runner exits” to reduce coyote overconsumption. Ivanpah officials have also reached out to the U.S. Fish and Wildlife service, who are working hard alongside the plant workers to ensure continued environment-conscious measures are taken.

CSP has shown to be more than just a tool to control the economy, it has also shown to be a very influential tool in national politics. In the Middle East, Saudi Arabian prince Mohammad bin Salman has been pushing political and economic reform to “end Saudi oil addiction” [2]. This series of progressive reforms have put Saudi Arabia at the forefront of environmental consciousness and has pushed the historically conservative country to the helm of social modernism in the Middle East. With Saudi Arabia serving as one of the most powerful and well respected countries in the region, this surge of progressivism may cause a domino effect in which its neighboring countries begin issuing political reform and calling for an end to oil based economies. In all regions however, there is an understanding of the impact CSP has on the carbon footprint humans leave behind. International agreements such as the Kyoto Protocol and the Paris Accords have several countries scrambling to keep up power production while limiting their CO<sub>2</sub> emissions. Naturally, several people have turned to renewable energies, and have unsurprisingly found CSP as a strong contender for reducing CO<sub>2</sub>. The National Renewable Energy Laboratory headed the Life Cycle Assessment Harmonization Project. This projects aim was to do a meta-analysis concerning various types of power plants over the course of their lifetime via harmonization techniques [22]. A resulting graph of various Power plant types and their statistical Emissions in their life cycle can be seen below in Figure (10). The resulting study found of the various fossil fuel systems, CSP and other renewable energy systems had central tendencies 400 to 1,000 g CO<sub>2</sub>eq/kWh below them. While this study does not take into account Carbon Capture and Storage (CSS) techniques, the theoretical reduction of such systems (80 % to 90 %) would still put the average emission of fossil fuels such as coal well above CSP’s average emission.

**CONCLUSION**



CSP technologies has shown to be a promising substitute for classical power generation schemes. From its storage capabilities in TES to its ability to exist as hybrid, stand alone, or sub power systems, CSP has shown to be an independent and incredibly versatile power solution. CSP is changing lives in countries around the world. It has the potential to revolutionize trade in the Euro-African region, thus building new political bridges and modernizing the economies of many developing nations. CSP has shown high potential in equatorial nations such as Bangladesh, Brazil, and countries in the MENA region. These locations have high average DNI, allowing for CSP plants to be established in multiple regions. Projects of this scale could give rise to entire new industrial sectors in these nation and could eventually break the dependence on oil and coal that many countries developed. More and more organizations are recognizing the potential of this technology, and as funding begins to increase, the LCOE will decrease while CSP technologies become more energy efficient, easy to use, and cheaper. While CSP has been shown to be an effective political weapon for asserting one's authority; more often than not, CSP is an innovative tool for advancing society as a whole in terms of environmental awareness, energy independence, and industrial diversity.

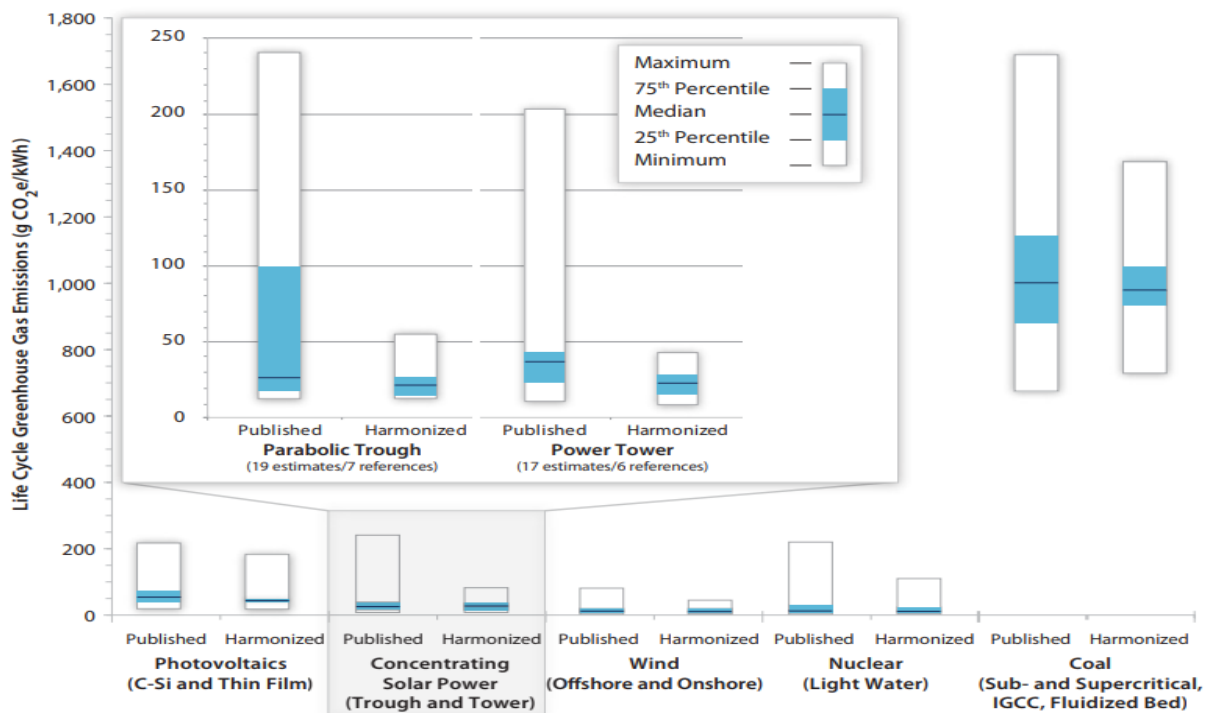


Fig 10. Box and Whisker Plot of CO<sub>2</sub> emissions of various Power Systems [22]

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**Capping of State and Local Tax Deductions: K-12 Educational Funding  
Challenges and Expected Responses for High Performing States**

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Towson University

Abstract:

The Tax Cuts and Jobs Act of 2017 enacted a cap on the deductibility of state and local taxes, an action which may be expected to create fiscal challenges for a preponderance of states with the highest K-12 standardized performance test scores. A characteristic of many of these high performing states is that they impose high state income and/or property taxes which, through 2017, provided, in effect, a federal subsidy for many of them. This article examines how these states might be expected to respond in light of the tax change, which is expected to significantly diminish this benefit. Factors examined include the potential impact of new economic pressures as well as a review of how these states responded to fiscal pressures following the 2008 economic recession. Also considered is how a state's political composition of different political ideologies may be expected to affect future actions

Ethical Perception and Color Psychology

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Paul Cohen, DO

Vera K Koumbiadis

**Abstract:**

The purpose of this study is to examine whether and individual's ethical perceptions are effected by color. Colors have been known to effect behavior and cognition (Elliot & Maier, 2014). Many associate color with aesthetics properties in our day, yet colors may play an important part on one's decision-making. The researchers examine whether a difference in ethical perceptions exists between two groups of newly graduated accounting students by the introduction of the colors red and blue. The students were selected from Association to Advance Collegiate Schools of Business (AACSB) accredited colleges in New York State. We measure students' ethical perceptions using as our foundation Kohlberg's (1968) Cognitive Moral Development (CMD) theory. A cross-sectional study was conducted using Victor and Cullen's (1988) Ethical Climate Questionnaire (ECQ), which is based on Kohlberg's CMD theory. Nine hypotheses derived from the ECQ are tested using independent sample *t*-tests and Levene's test for homogeneity of variances. Overall, results for the majority of the hypotheses studied reveal statistically significant differences between the two groups of accounting graduates when introduced to colors. The findings of the study suggest that the ethical perceptions of newly accounting graduates were influence by the introduction of color and are in line with Kohlberg's theory of moral reasoning and Color Psychology.

**Disruption in the Remittance Market: Blockchain and Cryptocurrencies**

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*Mary Kate Naatus*

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**Abstract**

This paper analyzes the research on blockchain and cryptocurrency technology and the alternate banking system, and its potential utility for the millions of migrants living in working around the globe, who send nearly half a trillion dollars through various formal and informal channels to family and friends in their home countries. While research on migrant remittances is well established and has been examined from many different lenses, including economic, political, financial, sociological and entrepreneurial, there are few studies to date that examine how the growing crypto-blockchain channel can impact remittance flows, as a lower cost alternative to MoneyGram and Western Union, which have high transaction costs, and also considering that many migrants do not have formal bank accounts, eliminating formal bank transfers and also that many migrants hold a vulnerable legal status, and may avoid formal money transfer channels. This paper introduces the discussion in this area and identifies potential future research in this field.

**Keywords:** mobile banking, migrant remittances, blockchain, cryptocurrencies, bitcoin, economic development

**Introduction**

There has been much speculation and discussion around the topics of cryptocurrencies and blockchain technology, and hence can be challenging to separate the facts from the fiction. Proponents and early adopters embrace the efficiencies and significant potential of these technologies to transform complex processes and the de-intermediation of financial markets with cryptocurrencies. On the other side, critics and skeptics focus on unpredictability of unregulated financial markets, over-speculation, illegal transactions and massive energy consumption by the most popular blockchain's algorithms (Zhao 2018). This article examines the broader issues surrounding the emergence of blockchain and cryptocurrency, with a particular focus on its potential to disrupt the global remittance market, potentially streamlining and facilitating the transfer of funds by migrants across international borders.

Unlocking the capabilities of the technology could potentially help millions of migrants living and working around the globe, who send nearly half a trillion dollars through various formal and informal channels to family and friends in their home countries. These migrants often play a major role in their family's, community's and country's economic survival through the infusion of a significant amount of capital in the form of migrant remittances, sent from abroad. Since remittances have significant economic development impacts across the globe, research in this area can also have policy implications. There are many entrepreneurial opportunities for companies who can meet the unique needs of the actors in the remittance market and provide the most seamless, low cost and culturally appropriate services in order to get a foothold as a major channel in remittance activity and transfers.

While research on migrant remittances is well established and has been examined from many different lenses, including economic, political, financial, sociological and entrepreneurial, there are few studies to date that examine how the growing crypto-blockchain channel can impact remittance flows, as a lower cost alternative to the traditional channels used by MoneyGram and Western Union, which have high transaction costs, and also considering that many migrants do not have formal bank accounts, eliminating formal bank transfers and also that many migrants hold a vulnerable legal status, and may avoid formal money transfer channels.

Many FinTech entrepreneurs are creating new blockchain-based digital transfer services for migrants and remittance recipients in countries like the Philippines and Singapore, in the hopes of gaining market share by increasing efficiency and lowering costs for the senders of remittances. The authors believe that the remittance market is an area for growth for crypto-blockchain companies and that more research is needed in this area to assess the strengths and weaknesses of these channels as well as the economic development implications.

### **Why is the the Remittance Market Ripe for Disruption?**

Only about half the adults in developing economies have a formal bank account, and the stats are even lower for women. There are a variety of formal development efforts underway to facilitate access to the formal banking system, but this is also an opportunity for companies in the crypto-currency or blockchain fields to provide more efficient transfer services at a lower cost. In general, blockchain technology can offer advantages of a) increased transparency, b) lower transaction costs than in the current system and c) high risk of fraud in the traditional system.

### **The Opportunity**

According to World Bank data, the broad market opportunity for financial services companies and banks to attract the world's nearly 2 billion unbanked people is significant, and they value this opportunity at more than \$375 billion, with the remittance industry ripe for growth. Several blockchain-powered financial transfer startups are beginning to permeate the remittance industry, and include companies such as Ripple, WorldRemit and Regalii, which provide efficient and convenient transfers using SMS texting, mobile transfers and easy currency conversion.

### **Blockchain Technology and Cryptocurrencies: Industry Overview**

The first successful cryptocurrency system was created under the name of "Bitcoin" by an author that published a white paper on October 31, 2008 under the name of Satoshi Nakamoto. Built on years of previous research on the idea of creating "digital cash" based upon a trusted authority, such as a bank, and cryptographic concepts, the white paper broke with the final barrier of trust on an external authority and creating trust on a network of users of peers of equal authority. The brilliant idea was a consequence of the breakdown of trust on the banking system after its failure in 2007 and the need for governments to "bail out" the banking system to avoid a humanitarian catastrophe. In the ideas of the author(s) of the paper, now trust was transferred to a community of users, and away from the untrustworthy banks and governments. The community of users was now the guardian of the transactions and the ledgers, based on a data-structure named a "Blockchain", consisting of blocks of data merged with the "hash" or "checksum" of the data of the previous block. This data-structure made the ledgers of the transactions of bitcoin practically impossible to tamper with, a very important property with large consequences for many other applications in the business world.

Each of the users (nodes) of the bitcoin peer to peer network was the holder of a complete ledger of the transactions from the beginning, from the genesis of the bitcoin blockchain. After a few years of establishing the bitcoin concept and as it became successful, its creator, Satoshi Nakamoto, disappeared from public view and only the software developers continued to have a role in maintaining the bitcoin structure.

Following the success of bitcoin, other ideas started appearing for other applications besides the "cryptocurrency" role. There were discussions about the limitations of the scripting language used in bitcoin, in that it was quite primitive and not a complete "Turing programming language". This was considered as a limitation for other types of applications, such as for putting contracts together, to help with other types of transactions, to make the concepts of the blockchain more useful and more powerful. The concept of Ethereum described in a white paper, is associated with the name of Vitalik Buterin, an entrepreneur. The concept includes a cryptocurrency, the "ether" that can be used as a coin such as bitcoin, but can also have many other uses inside what are named "Decentralized Applications". Ethereum includes a Turing complete language (Solidity) that is used to create smart contracts. These

contracts are created in programming code and stored in the Ethereum blockchain to be executed when conditions in the logic of the programs are met.

Ethereum can be used to design many different applications that include a cryptocurrency and has many programmable features that expand the use to many other transactions and contracts.

As we continue moving away from the cryptocurrency part of the blockchain technology, we reach a point where there are complete families of applications where there are no cryptocurrencies involved. There is a branch of projects that starts with the Hyperledger technology, an Open Source project under the Linux Foundation. This technology focuses on the business networks, exchanges, purchases, contracts, blockchain ledgers, lower energy consensus mechanisms, and does not require a cryptocurrency to fuel these exchanges. Very popular are open source technologies promoted by IBM, such as Hyperledger Composer, Playground and Fabric. These technologies are very attractive since they do not suffer from the uncertainty of the cryptocurrency markets and are designed for full transparency, identity and full legal and ethical compliance.

Since this paper concentrates on transferring currency across the world, is very likely that an initial solution that includes a cryptocurrency, such as using bitcoin directly or using a blockchain solution with contracts in Ethereum may become popular at some stage. This is because the technology is easily available right now and can be used at small scale across international boundaries. Current blockchain projects without cryptocurrencies require a scale and a level of investment not easily available in the remittance market and may need to wait for the right conditions, investors and champions.

### **Snapshot of the crypto-remittance industry**

While traditional money transfer services like Western Union and MoneyGram continue to dominate market share, there are several innovative entrepreneurial firms breaking into the growing market space with a focus on international money transfers, particularly migrant remittances. These companies are incorporating blockchain technologies and cryptocurrency, and are capitalizing on the inefficiencies in the current remittance market, including high fees, delays and time limitations of the brick and mortar model, to win market share. A number of these include: Ripple is a technology company founded in 2012 in San Francisco, that provides a payment platform that facilitates global money transfers in many regions and 27 different countries. It works by allowing users with the "Ripple wallet" to access the money in the local currency without having to do costly or time-consuming conversions. The company was named as one of the top 50 smartest companies by MIT Technology Review in 2014, and is now working to build an ecosystem around the XRP cryptocurrency as well as partner ([Orcutt, 2018](#)). Ripple faces criticism by other stakeholders in the cryptocurrency community, particularly those who prefer a "purer" approach with cryptocurrency firms completely disassociated from more traditional institutions like banks. From this perspective, Ripple's close partnerships with larger banks and the infrastructure built around its own XRP technology are questionable and even anti-productive to the broader industry.

WorldRemit is a London-based digital platform facilitating money transfers across national boundaries, as long as users have internet access on their electronic or mobile device. They call themselves the "WhatsApp of Money." By focusing on Mobile Money transfers, eliminating many of the intermediaries in the traditional money transfer process and allowing anyone with a cellphone to receive money digitally. Another company based in Asia and reaching global customers in the remittance market is Alipay, which is self-described as the first mobile wallet-based cash transfer tool secured by blockchain technology. Benefits that the company has cited from the use of blockchain include streamlined and more efficient process of transfer and transaction, as well as transparency and security. With blockchain, the transaction can be executed and verified simultaneously within.

A final example of one of the many startups exploiting blockchain technology as the building block for a money transfer platform is Circle. They describe themselves as a "crypto finance company on a mission to change the global economy," and their blockchain-based platform and were notably the first company to receive a bit-license from the State of NY. In 2017 they launched a no-fee app to allow remittances transfers between senders and recipients with no formal bank accounts, a significant segment of the

global population, and one highly dependent on remittances. Circle uses Blockchain technology as well as Bitcoins in the transfers. Circle as well as the other startups described here are leveraging the efficiencies and instantaneous transfers of crypto and blockchain as well as the ubiquity of mobile devices in households around the world, to drive down costs and gain market share in the remittance industry.

### Conclusion

Identity management, international contracts, and all sorts of complicated bank transactions can be greatly altered with the public ledger system available in blockchain systems. The process could (in an ideal world) work seamlessly, crossing boundaries where banks, logistics, compliance or a plethora of other obstacles once existed. They could be combined with the Internet of Things to create a more connected and automated world. Future companies may be able to absorb mountains of new data, or even digitize real-world things that are hard to quantify. Unfortunately, many big companies are remaining quiet on their studies in the blockchain field for obvious reasons.

However, it is public knowledge that nine major banks, including JP Morgan and Goldman Sachs, recently joined a partnership to develop blockchain technologies. That's not to say major companies are getting in on the cryptocurrency game; rather, they realize that the blockchain system itself, could be a powerful tool for efficiency, even when not specifically including cryptocurrencies. With a system as versatile and secure as the blockchain, there may be many unexpected innovations in the coming months and years. In addition, the potential to positively impact global cash flows especially to the world's most vulnerable people and communities, is certain to garner interest in the fields of impact investing, migration and remittances, blockchain and cryptocurrency.

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Persuasion Strategies in Disease Prevention and Early Detection Behaviors: Examining the Interactive Effects of Message Framing and Evidence Type

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**Extended Abstract:**

Little is known about the joint impact of framing and evidence across a diversity of health issues in different contexts. To date, no study has simultaneously examined the combined effects of message framing (loss vs. gain) and evidence (exemplar vs. statistical) in disease prevention versus early disease detection contexts. To address this important issue, the current study aims to test two framing-evidence theoretical frameworks of predicting attitudes and behavioral intentions towards disease prevention and detection.

To test such effects, two experiments were conducted using identical procedures in the contexts of promoting early detection (mammography screening) and prevention (smoking cessation) attitudes and intentions. The first experiment employs a 2 (message framing: gain vs. loss) × 2 (message evidence: exemplar vs. statistical) between-subjects experimental design (N=445 women). The second experiment was designed to test the proposed hypotheses in the context of prevention with 467 smokers.

The results indicated that loss-framed statistical messages were more persuasive than other three messages in promoting both prevention and detection attitudes and intentions. Also, positively-framed statistical or exemplar messages elicited more positive attitude toward prevention than loss-framed exemplar messages. Loss-framed exemplar messages induce boomerang effects in both prevention and detection contexts. The results offer important theoretical and practical implications that we discuss in the next sections. Advertisers engaged in promoting attitudes and behaviors toward mammography screening can benefit from the combined use of factual quantitative information (e.g., statistics, percentages, frequencies) with negatively-framed appeal that highlights the costs of not complying with mammography screening recommendation. In addition to loss-framed statistical messages, social marketers can also use positively-framed messages with statistics or anecdotal information to improve peoples' attitudes toward anti-smoking advertisement.

*Keywords:* message framing, evidence, mammography screening, smoking cessation, early disease detection, disease prevention



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Discussions on social responsibility and business ethics often center on looking at case studies of organizations who are either socially responsible vs. socially irresponsible; very few studies explore the linkages between social responsibility and business ethics based on the impact that a rigorous curriculum coupled with student written case studies at a U.S. university may have on future leaders of organizations. This paper will look at the how such a curriculum could impact moral and ethical thinking and actions in young adult learners and the impact that this critical thinking skill can have in the practices of business ethics as they become managers and/or leaders in their organizations and communities. In general business schools understand the importance of teaching about social responsibility and business ethics but oftentimes the linkages between this learning and actual practice are not immediately evident. Using student written case studies as examples, this paper will show the connection between a rigorous business ethics curriculum centered on student written case studies and moral development.

*Keywords: curricula, business ethics, codify, teaching, pedagogy, integrity, character, unethical organizational conduct, student written case studies, ethical critical thinking skills, moral reasoning.*

**Introduction:**

The perception of business today by many is that it is a zero-sum game where you have winners and losers; a game that must be “won” at any cost [i.e. cutting corners or acting in an unethical manner] in order to remain competitive. This type of mindset leaves the door open for unethical conduct which is evidenced by the multitude of recent organizational scandals like Madoff's Ponzi scheme, Toyota's brake failures, Enron's accounting fraud, Arthur Anderson's complicity, Lehman Brothers' financial collapse, Pontiac's ignition recall, Volkswagen emissions scandal, BP's Gulf oil explosion & spill, and even emoluments clause issues currently being litigated. What these examples highlight is that now more than ever, business ethics courses are not just relevant but vitally important in our society. Especially so because many of us are in the business of educating young men and women [young adults ages 20-25 years] who will shortly [within 1 to 2 years] enter the business world and begin to impact their organizations with their conduct, beliefs and practices; especially as they move up in the organization and take on greater organizational responsibility.

Business schools/programs are cognizant to the evidence that suggests that this learning is essential and have responded to this challenge (Pizzolatto & Bevill, 1996) by creating curriculum and pedagogical practices which in some instances are successful, but at times unsuccessful in the cultivation of codified moral reasoning leading to long-term ethical habits. The challenge is engaging university students in such a way that they become moral agents and understand the importance of personal integrity and character given the numerous examples of unethical organizational conduct and the social pressure exerted upon them by peers and/or managers, environmental pressures and overall temptations.

While there is much merit to using case studies as a medium to engage students in discussion and deliberation to codify behavior, their shortfall is that they may not be relevant to a young adult who has not yet fully entered the “real” business world. Within this context, this paper will discuss the impact of student written case studies may have. This pedagogy contends to move the learning experience from: passive/observant to active, apathetic [why should I care about what happened at Enron?] to emotionally invested, and to narratively open and engaged. Presentations of these student written case studies [based on their own experiential part time jobs or sports team experience] allow students to reconcile their decision making with their classmates and through this deliberation they can then reflect upon the incongruity of their self-understanding and their behavior in order to reach a conclusion about their moral reasoning and personal character. It encourages moral critical thinking with solid

justifications, without the need to preach because this Socratic method puts the student in the driver's seat.

The professor serves as a facilitator to push the moral questioning further. This coupled with a thorough academic curricula, centered on exploring the various moral and ethical philosophies relevant to business practice, team activities like case study analysis with written responses, "minute" quizzes [a 2 to 3 Minute written assignment at beginning of class related to assigned reading <an arbitrary question> to encourage students' pre-class preparation], and short exploratory videos encourages active engagement and [many times heated] discussions. To concretize the value of student written case studies three of these cases will be analyzed to demonstrate the evolution of moral thinking which occurred during the semester and how students came to their own moral reasoning about their conduct and respective actions encouraging them to "... possess moral reasoning capabilities that are adaptive to the unfamiliar and unexpected situations" (Sadowski, Seager, Selinger, Spierre & Whyte, 2013) which they will face in the "real" business world.

This paper is broken up into the following sections: Section 1 Inadequacy of Existing Business Ethic's Education, Section 2 are Examples of Student Written Case Studies, Section 3 includes the Conclusion and Discussion, followed by Section 4 Limitations of Study.

#### Section 1: Inadequacy of Existing Business Ethic's Education

Much has been written about our current university student population and about the curricula best suited to reach them. Equally, much has been written to explain how we learn ethical conduct and while the literature abounds regarding both these topics what can agreed upon are some central tenets.

Firstly, character is the basis of ethical behavior. It is "what you do when 'no one is watching' and is developed over time through the accumulation of values gained from a variety of sources including families, friends, schools, coaches and churches" (Galbraith & Webb, 2010, p. 42). Ethics and the idea of right versus wrong are socially constructed and may change over time [for example, the stigma and taboo of divorce prevalent in the 40's, 50's has over time become common place today]. Therefore, it is crucial to recognize that some of these exposures/influencers may not provide good examples of moral and ethical development. Further, an ethical dilemma, by definition, are situations in which there may not be one clear right or wrong answer. This is especially true when we deal with organizational ethical dilemmas which often must consider multiple primary and secondary stakeholders all competing for their best interest. Secondly, as we become a more interconnected world [due to globalization], it becomes necessary for organizations to contend with differing ethical values [which may vary by culture], policies, laws, issues of bribery, employment rights, right of marginalized groups in decision making. Thirdly, "people are not always guided by an internal moral compass; rather many look to external sources for direction. Organizations that reward profitable decision over the well-being of people perpetuate unethical environments" (Galbraith & Webb, 2010, p. 42). All of these both individually and collectively exacerbate the challenge students will face when trying to resolve an ethical dilemma.

Since our "moral judgement has been proven to continue to develop through adulthood and moral reason is a lifelong process" (Galbraith & Webb, 2010, p. 42) there are opportunities to influence behavior at the university level provided we are engaging students in a way that is personal to them. In view of the diversity in some our American classrooms there's an opportunity to challenge students further. "An increasingly diverse social, cultural, ethnic, racial, and gender composition ... students do not necessarily share any single cultural heritage or belief structure. Finding common ground between students and faculty, indeed between groups of students themselves, is not easy...If nothing else, diversity can breed openness to new views and different ways of thinking—necessary if they are ever going to learn to think for themselves." (Bertalomi, 2004, p. 418). These young adults are the perfect age for developing moral critical thinking skills, because they are straddling the two words of adolescence and adulthood; coming to us with some already pre-established views of right versus wrong, but not

fully aware of the business challenges they will shortly face. This time in their lives is an opportune time to question, critically think, follow and hold to ethical practices that results in "...a unified set of ethical values resulting in ethical behaviors that can resist compromising when faced with ethical dilemmas" (Galbraith & Webb, 2010, p. 42).

The challenge lies in the pedagogy used to engage students. The case study method alone may lack relevancy to the student. On the other hand, the lecture and note taking is a passive activity that many students find devoid of interest. Ethical principles and terminology is abstract, off-putting, not relatable and dry further exacerbating the challenge of capturing and maintaining a student's interest (Bertalomi, 2004). Under these teaching strategies students are merely completing an academic requirement "taking a course" towards degree completion, but their minds are far from engaged. Effectively linking learning with application, engagement and critical thinking is necessary so that they not only understand what is right versus doing what is right in order to then apply their learning to daily life. "Simply put, people do not necessarily do wrong because they do not know what is right. There is something much deeper than simple knowledge at the root of ethical behavior" (Bertalomi, 2004, p. 417).

Individually student written case studies, provides a tool to take the abstract theoretical moral and philosophical learning and an ethical event which has occurred to the student to another level of learning. They are required to analyze this personal event from the lens of an objective, methodical perspective, to draw inferences and conclusions based on sound systematized moral reasoning. Many times, in this process, they themselves, recognize that their actions [when the event originally occurred] or the actions of others was morally questionable and through this scrutiny their moral development and maturity evolves.

#### Section 2: Examples of Student Written Case Studies

Towards the middle of the 16-week semester students must write a one paragraph summary of their case study and identify the ethical dilemma within it (written guidelines are provided). The instructor reviews this summary to ensure that it is in fact an ethical issue and to help guide the writing of the first draft of this case. The case study is first submitted as a draft assignment and then two weeks later resubmitted as final draft after instructor feedback has been given. The final paper includes at minimum three academic sources to support the case and three case questions. Finally, a PowerPoint Presentation summarizing the case is submitted with final paper and this is presented to their classmates in the last three weeks of class. Students are given 20 minutes to present their case and to engage their classmates in the case studies question responses.

The purpose in having students use experiential learning from part-time jobs and/or sports team experiences to write their own ethics case studies is to personalize the curriculum. It requires them to be honest, objective and introspective about ethical incidents from their lives. Students are required to change the names and places of the real incident to protect the identity of employer and employees. The examples excerpted below do not include any personal identifiers for this reason and are cited as written by the student. In preparation for this case study assignment the curriculum in the weeks preceding this assignment is devoted to lectures, minute quizzes, discussions, team case study analysis and videos discussions. Excerpted below are three examples student written case studies.

Summary of Case # 1:

Abstract: This case explores the ethical dilemma of lying to customers about shipping dates. This paper will discuss different judgments, moral and philosophical ideas that ultimately led to lying by omission. The moral and philosophical ideas that will be discussed include; utilitarianism and egoism. The paper will conclude with a discussion of how to end the ethical dilemma.

Excerpt: The Role of Value Systems

Considering that business is sometimes thought of as having its own rules, Dominique saw it as doing what was best for business. Dominique was making a separation between honesty in her regular life and honesty in her business life. Chapter 3 in *Business Ethics: Ethical Decision Making and Cases* discusses the same issue that Dominique was faced with. The example given in the book goes hand in hand with this ethical dilemma because it talks about how an employee "...may be asked to lie about when a customer will receive a purchase" (Ferrel, Fraedich, Ferrell, 2015, p. 64). Dominique lied in order to "help achieve performance objectives" (Ferrel, Fraedich, Ferrell, 2015, p. 64). Dominique saw this ethical dilemma as nothing but a white lie, which by definition is just a small lie that doesn't intend to cause harm. Instead the white lie was told to actually protect all the parties involved.

This leads right into the next point of the moral and philosophical of Utilitarianism which had a big impact on Dominique's judgment. Dominique's idea that her small lie to her customers wouldn't hurt anyone and instead creates a positive for everyone follows right in line with what Utilitarianism stands for. Dominique believed she was creating the "greatest good" (Ferrel, Fraedich, Ferrell, 2015, p. 159) for her customers, herself and future customers. The "greatest good" (Ferrel, Fraedich, Ferrell, 2015, p. 159) was created for the customers because they think that their product is on the way even if it is going to be delivered a few days later than expected. Dominique benefited from lying by omission because the customers will think highly of her because she gives off the impression of shipping quickly. Shipping quickly is good for her brand image. This entices customers to want to come back and purchase from Dominique again. Customers view fast shipping as a major consideration when making purchase decisions.

Lastly the "greatest good" (Ferrel, Fraedich, Ferrell, 2015, p. 159) was created for potential future customers because they will be able to see the reviews from previous customers and that will allow them to feel safe when buying from Dominique. In Dominique's eyes through her utilitarianism way of thinking it is a win/win situation for everyone. As mentioned before within this case Dominique could also been seen as an egoist. Everyone's action within the ethical dilemma was made in order for Dominique to benefit. Even though there was a part that focuses on the customers, the only reason Dominique started lying initially was because she wanted to make herself look good. The customers get their product, Dominique gets her good ratings and future customers get to see honest reviews from previous customers which all promote more sales for Dominique.

#### Position Influencing Judgement

Dominique is the main person running the small side business and her friend Emma takes the packages to the post office for her. Emma isn't a legitimate employee of Dominique's. It's more like a friend helping a friend. Besides Emma there is nobody else that has any involvement in the business. This means Dominique has the head position in the business without having to worry about others opinions. Dominique knows her friend will not question how she runs her business. Emma just takes the packages whenever Dominique tells her to.

Often times Dominique and Emma might laugh about how Dominique lies to the customers about their packages being shipped out. Having a friend helping out with the business makes Dominique's judgment even worse because they make a joke of the situation; never realizing it is a real life ethical dilemma. Dominique also failed to realize that her actions could seriously affect her customers. Some of the customers could have caught onto what was going on and then left a bad rating for other potential customers to see. Then there are other customers who may have bought an item from Dominique and expected it to arrive on a specific date for a special occasion, but in essence Dominique is breaking a contract of trust between customer and vendor.

Further, Dominique does not take into account any of these issues that might create problems for her customers. Instead she is just worried about protecting herself. One of the main problems that allows this ethical dilemma to continue is Dominique being the owner because she does not have to be

accountable for making the decision to lie to her customers. Emma is not a true employee and as a friend probably doesn't think her friend is doing anything wrong which also allows the problem to persist.

### Resolving the Ethical Issue

The ethical issue was not resolved until Dominique actually started taking a class in school and began learning about business ethics. Initially Dominique just thought it was a small white lie that would not hurt anyone. Dominique thought there was no way her customers would actually find out about when she was actually shipping the items. When Dominique started learning in her business ethics class that lying by omission was an ethical lapse she realized she had to change how she was running her business. Not only did she not want to run her business based off of lies, but it was also a question of her character. She is in the business of convincing people she has the best price or the best product and negotiating prices to make the sale so this small side business gives Dominique an insight into what being a salesperson for a B2C company would be like.

If this is her first experience and she is dealing with ethical business lapses that she has committed on a small scale who knows how she would handle ethical issues in the workforce. Learning about ethical issues now and experiencing it firsthand is the best thing that could have happened to Dominique. She recognizes that she must change her conduct. Her new approach is to communicate honestly with the customer, if she knows that she will be busy she simply sends a message to her customers and lets them know the exact day she will be able to ship. The app she uses to sell her items actually allows her to choose an option to disclose how long the item will take to ship. There are options of 1-2 days, 2-3 days and 3-4 days. Choosing one of the options that allows for more time to get the item shipped out allows Dominique to have more time to fulfill orders despite her busy schedule without having to lie to her customers. One thing that Dominique found is that customers actually understand and appreciate her honesty when she does tell the truth about shipping dates.

### Summary of Case # 2:

Abstract: This case will explore the ethical dilemma that arises when a recently promoted sales associate is confronted with the changing behavior that management has instilled in order to beat projected sales goals. By incorporating various ethical ideas such as corporate culture, misuse of company time, bribery, lying by omission and other factors this case will vividly illustrate the ethical misconduct in a retail environment.

### Excerpt:

Observing what is going on, he notices Frederick grabbing numerous amounts of the same bag along with other items such as wallets to begin ringing up the customer. As Frederick grabbed the items and stacked them on the register, Ronald noticed that there must have been a total of twenty or so items on the counter. Thinking to himself, Ronald realized that this one transaction was a little over two thousand dollars' worth of merchandise and would be a nice commission for Frederick. Vividly admiring the successful sale from afar, Ronald noticed that not every item was being scanned individually, although being the same style, which drew concern (is there was collusion at play?). Frederick was the type of guy that believed in bending the rules for the good of the store. By definition, collusion "typically involves an employee who assists the customer in fraud" (Ferrell, Fraedrich, Ferrell, 2016, p. 79). Ronald knew this was wrong but felt that he was not in the right position to let management know that this event had occurred.

In the upcoming weeks, Ronald would notice the same trend with Frederick in helping customers who were buying numerous amounts of the same style bag. Which was increasing his sales volume dramatically while leaving Ronald trailing behind in the store rankings.

It was during this time that Ronald felt that he was being cheated out of making his sales goals and commissions due to the fact that his customers were not purchasing the large amounts of handbags that Frederick had sold.

Ronald had ultimately shifted his sales tactics and during retail rush hours would only target those who seemed that would be a potential reseller. He then realized certain behaviors that resellers would have, which included taking pictures of handbags, asking for prices along with any discounts, and most importantly taking down the contact information of the sales associate that had assisted them. These were all behaviors that Frederick had put into practice and ultimately made management happy. The only downside to this was now clients such as Elizabeth became lost in translation and were not given as much attention as the resellers. Ronald was beginning to understand how Frederick had attained and beat his sales goals.

Months soon passed and the holiday season was officially over. Now began the slower months of retail where retail traffic has seemed to come to a standstill. Ronald had successfully crushed his sales goal for the holidays and was no longer trailing behind Frederick.

Ronald reflected that his rise throughout the store rankings came fairly quick but was due largely in part to the unethical behavior that was encouraged through both the corporate culture and his actions. Being the self-conscious man that he was, he decided to rectify his behavior and did some research on a few instances that he deemed to be unethical.

The instance where Ronald realized that Frederick was participating in collusion should have been enough for him to speak up; "blow the whistle". Most organizations have an employee tip line where they could anonymously report other employees if they believe they are participating in illegal behavior. Ronald had recently found the number and decided to give a quick tip to the hotline. "Globally, dishonest employees are behind about 28% of inventory losses, while shoplifters account for a markedly higher 39%" (Fisher, 2015, n.p.). Ronald thought to himself that these statistics were all very interesting. "Usually it happens during checkout, when an associate manipulates a transaction to benefit themselves or someone else," says Deyle. Employees might, for instance, enter refunds, discounts, or voided transactions into a cash register. They can also "cancel transactions, modify prices, or say someone used a coupon when they didn't." (Fisher, 2015, n.p.) Collusion is a very serious threat to retail establishments everywhere and employees and other management officials should monitor and report suspicious activity when present.

Ronald didn't know the severity of his actions and was now feeling very uneasy especially how he had handled business with his client Abhishek. The store policy had indicated that all items that have been bought in the states could not be returned or exchanged outside of the country. "Lying by commission can involve complex forms, procedures, contracts, words that are spelled the same but have different meanings, or refuting the truth with a false statement." (Ferrell, Fraedrich, Ferrell, 2016, p. 69) Ronald knew that covering up the fact that his client would not be able to return the merchandise in India would have greatly affected his decision in purchasing the selected products. Due to the circumstances of meeting a sales goal, Egoism is responsible for the actions that Ronald underwent in order to make the ends meet. "Egoism defines right or acceptable behavior in terms of its consequences for the individual. Egoists believe they should make decisions that maximize their own self-interest, which is defined differently by each individual." (Ferrell, Fraedrich, Ferrell, 2016, p. 159) Regardless of how the store performed in regards to the sales goal, Ronald should have acted in the best interests of the customer and not for the sole purpose of making his goal. Lastly, Ronald realized that he had actively been involved in collusion by giving his discount in an inappropriate manner. In this case, Ronald had committed collusion with Abhishek by giving the client a portion of his company discount in exchange for not only a lower price on the collection bag, but the remaining portion of the discount to be pocketed by Ronald.

Ronald realized in order to successfully maintain a clean career at his job; he must clean up his act and focus on the ideals that had gotten him promoted to sales associate in the first place. This meant that he would have to work twice as hard and maintain a strong client base of not just resellers but clients who made smaller purchases as well. Overall Ronald meant well in his actions but did not calculate the severity of his actions to the company for the long term. If he had been caught, Ronald would have ruined his reputation with the store and would have been terminated from his hard-earned position as sales associate. Thankfully he realized that he had made a step in the right direction now and hopefully will stay on this track.

Summary of Case # 3:

Abstract: This case will explore the ethical dilemma of working within a restaurant and having to make ethical decisions both in the kitchen and out of the restaurant in the delivery cars. This case deals with how employees in and out of the restaurant can be careless or unethical with the customers' food and whether or not it is right to serve people food that has been dropped on the floor or poorly taken care of in the delivery driver's cars. It will review various ethical principles such as moral philosophy, utilitarianism, teleology, and consequentialism so that the reader will be able to better understand the ethical dilemma.

Excerpt: In Robert's work experience, he has to make controversial decisions at the restaurant every day. On multiple occasions, Robert gave people food and other items that have dropped on the floor. Sometimes, if his boss saw that the food dropped on the floor, he would tell him just to throw away the food. However, if the restaurant was busy, which it was every day during lunch time and nearly every night, Robert would just pick up the food and wrap it back up and go on to make the delivery without any problems. Not only would he just do this on his own in the restaurant if nobody saw, but there were many occasions where he did this as well with food that was in the car for delivery. Very often in his car on the way to make deliveries, the food would bounce around, go all over the containers, and sometimes fall down onto the mats of his car. The plastic bags and 2-liter sodas would roll around on the floor and get dirt all over them, but often times he would just wipe it off and deliver it right to the customer, take his tip, and continue on with his deliveries. Some of Robert's decisions he made while working there may or may not have been the most ethical thing to do, but in some cases what the customer doesn't know won't hurt them. Robert's decision making can fall under stage two of Kohlberg's moral development because right behavior is defined by whatever the individual believes to be in their best interest (Ferrell, et al., 2016).

It is important to address the issue of Robert serving food to customers that has dropped on the floor. To some, eating food that has fallen on the floor is no big deal. Many follow the "five second rule," which makes it acceptable to eat food that has fallen on the floor for five seconds or less but not a second longer. Some people are also just not bothered by it if food does fall on the floor and will simply just brush off anything that is on the food. On the contrary, if some people drop food on the floor there is no chance they will eat the food due to germs, dust, dirt, or any other debris on the floor. The unsanitariness of food on the floor or ground makes it enough for people not to eat it. Robert has no issues with food dropping on the floor and it is completely acceptable in his household. He feels that if it is fine for him to eat it then there is no issue giving it to a customer. Robert acts as a utilitarian, and has decided that his actions are for the greater good for a larger majority of people.

Robert learned that in a recent study conducted by Professor Donald W. Schaffner at Rutgers University, the "five second rule" for eating food off the floor was found to be untrue. Regardless of the amount of time a piece of food has been on the floor, it can contract bacteria instantaneously. The research found that longer contact times with the floor resulted in the transfer of more bacteria (Mele, n.d.). Another important finding in this study was that the surface on which the food falls on matters just as much, if not more as the length of time it remains on the floor. Carpet had a very low rate of transmission of bacteria compared with tile and stainless steel; two surfaces found in nearly all restaurant kitchens (Mele, n.d.).

One incident of Robert's food dropping occurs very often actually and involves small rolls of bread that come with meals. In order for the boss and cooks to work faster and more efficiently, Robert is in charge of wrapping fresh rolls with tin foil and putting them in the bag with the customer's meal. Often in a rush, Robert would pick up the rolls out of the warming drawer and accidentally drop them on the ground but proceed by picking them up, wrapping them, and placing them in the bag to bring to the customer. Robert has no issue with this based on the fact that he is used to doing so at his home and his boss has seen him and done the same thing. The boss has the floors cleaned at the beginning and end of every work day so he does not see an issue with picking up food and serving it. Still, is Robert in the wrong for doing this?

Another ethical dilemma Robert faced was the dropping or rolling around of food in his car on the way to deliveries. Obviously when a vehicle is being driven anything inside is going to move around a bit. Also, Robert found it difficult to rely on his GPS because it would tell him when to turn too late and was forced to make sharp turns. As a consequence, his deliveries would go flying around the inside of his car. Robert found that when this happens to the deliveries the pizzas can slide out of place in the box and mess up the cheese or containers can flip over and move around all the contents on the insides. Not wanting to have to go back to the restaurant to get a new pie or a new meal, Robert just fixes the boxes and just tries to make it the way it was as close as he can. Is this ethically right for Robert to do? To mess up customer's food and then touch it and try to make it look like nothing happened?

In any restaurant, there are a lot of things that happen behind the scenes that the customer is unaware of. The customer places their trust in the employees of the restaurant to provide them with clean food that has been cooked and handled properly. There are certain scenarios that employees have to deal with and are trusted to make the best decision for the benefit of the customer. Robert is not completely in the wrong for serving food that has dropped on the floor to customers because of his own moral philosophy. He uses his own principles and values to determine what is right from wrong and in this case, he has decided that this is the right thing to do. To him, doing this was completely fine because it is what he does in his own home amongst his family. Not only did he feel as though he was simply providing the customer with their meals, but he was also helping out all of the employees at the restaurant by bringing in more money for them and getting more meals out the door.

This type of action is more frequently seen in the fast food industry, where health and safety within the restaurants are typically not the best and food has to be made and sold so quickly it is often dropped on the floor. Just as recently as last year the fast food chain Checkers faced a huge scandal when a video went viral of an employee dropping a burger bun on the floor and then preparing it to give to a customer (Bowerman, n.d.). Checkers and the employee were extremely apologetic for what happened and have since moved on from the incident. Surely, there are more incidents like this every day that have not been recorded on video. Robert is still not completely at fault; however, he should know that for the future that not everyone finds it acceptable for food to be served after being on the floor and if it does fall on the floor he should just throw it out. He should also find a way to have integrity in not only himself but his work. Robert needs to know the difference between right and wrong, regardless of what other people do and has to learn this on his own.

Using teleology or consequentialism, Robert considers his actions fine because the food is still getting to its destination. The definition of teleology states that an act is morally right if it produces the desired result (Ferrell, et al., 2016, p. 158). Robert's job as a delivery driver for Amici Pizzeria is to bring food from point A to point B, point A being the restaurant and point B being the customer who ordered it. As long as the food gets there in one piece and is not tampered with, Robert has completed his job ethically and morally. Robert can only control his vehicle so much and is as careful as he can with his deliveries, but he has no control over whether the pizzas or the food move around in the bags. As a solution, Robert could put a bin or container in his car to put deliveries in and by doing this it would minimize the movement of the deliveries.



### Section 3: Conclusion and Recommendations

Developmentally it is clear from these cases that the students' self-awareness led to ethical critical thinking and judgement about their own moral beliefs of right versus wrong. They recognized the importance of personal and business integrity and the impact this has on reputation. It is this type of critical thinking which enables them to assess ethical dilemmas. They have put the ethical and moral philosophies into practice by objectively recognizing the challenges that the "real" business world will pose. It encourages a reconciliation between their decision making with their classmates so that they can reflect upon the incongruity of their self-understanding and their behavior. Ultimately it encourages moral critical thinking with solid justifications for their actions. As educators, within our roles "One that does not teach values, ethics, or morality *per se*, but provides an approach and a syntax for students to both begin thinking about these things for themselves and to *want* to do so" (Bertalomi, 2004, p. 419). Through these student written case studies students are more fully engaged in ethical critical decision making. To summarize it best, "the difference between living ethically and studying ethics is the difference between playing a sport and reading the rulebook" (Bertalomi, 2004, p. 417).

### Section 4 Limitations of Study:

Ideally to draw further inferences about the significance of student written case studies, these same students should be interviewed five years out of college and then ten years out to better infer how their moral development has evolved over the course of years. Further the study should be replicated for each section consistently three to five years to verify the effect of assignment.

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An Empirical Study: Employee Engagement and Its  
Link to Organization Performance and Sustainability

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**Abstract:**

Employee engagement is the driving force of the organizations success; organizations that have pitiable employee engagement have experienced extensive employee turnover, low production and efficiency, decrease in consumer loyalty, decline in stakeholder value, and an ultimate detriment to their organizational success. Organizations that do not foster and engage employees end up losing valuable talent to other organizations. The study was conducted to examine the influence of various factors on employee engagement among customer service employees that work in multiple customer service sectors in the United States. For this quantitative research design, a Likert scale survey was used with statistical analysis on a sample of 262 participants from customer service sectors that included: transportation, banking, athletics, childcare, insurance, hospitality, information technology, and administrative assistants from Northern New Jersey and Philadelphia, Pennsylvania. The factors explored to examine the influence on worker engagement included work environment, relationship management, work engagement, and career development. The general business problem is that non-engaged employees in the workplace contribute to low performance rates and lack of goal achievements in the workplace. Statistical results revealed no significance with  $P > .05$ .

Keywords: Employee engagement, customer service, performance, sustainability, organization

Socio-Economic Impacts of Small-Scale Photovoltaic Systems in  
Rural Areas of Bangladesh— An Empirical Study

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### Abstract

Frequent and prolonged load-shedding does not allow consumers in rural areas of Bangladesh to use grid connected electricity for productive purposes. The lives of village dwellers, where 65% of the country's population live come to a standstill after sunset. Social activity, education, business, and recreation suffer from the lack of electricity. Small-scale photovoltaic systems (SSPVS) bring a glimpse of hope to this large population by providing a clean source of light in the evening when needed the most. This survey looked into photovoltaic system's cost, loan terms, financial and technical infrastructure, reliability, and affordability. This paper also discusses the long-term sustainability of the SSPVS in Bangladesh.

### I. Introduction

Bangladesh is situated between 20°30'N and 26°38' N and 88°04' E and 92°44' E. The total area of the country is 148,460 square miles and a total population is about 160 million (ranked 8<sup>th</sup>). The population without electricity is over 60 million and almost everyone without electricity lives in the rural areas [1]. Bangladesh Power Development Board along with private sectors have made significant progress to keep up with the electricity demand. As of October 2017, the total installed capacity was 13,621 MW, which is 8,419 MW more than that of 2006. The total number of consumers increased from 1.64 million to 3.15 million in the same period of time [2]. Despite this aggressive addition of installed capacity, Bangladesh is ranked 50<sup>th</sup> in electricity generation. The average electricity consumption in Bangladesh is 365 kWh/year/person, which is a fraction of the world average electricity consumption: 2,799 kWh/year/person [3].

Infrastructure Development Company Limited (IDCOL), Grameen Shakti, and many other government and non-government organizations have been working tirelessly to provide clean light to people in remote rural areas of Bangladesh. As of September 2017, over 4.14 million small-scale photovoltaic systems (SSPVS) have been installed to supply solar electricity to 18 million people, who previously used kerosene lamps for lighting purpose. IDCOL is working to finance 6 million SSPVS by 2021 with an estimated generation capacity of 220 MW [4]. Grid-connected PV systems have no significant contribution in electricity generation.

This paper investigates small-scale photovoltaic systems and their impacts on socio-economic conditions such as income, health, education, social and recreational life, public affairs, security, and the empowerment of women.

### II. Small-Scale PV System Design and Cost

IDCOL and partner organizations provide PV system packages with module peak power ratings ranging from 20 W<sub>P</sub> to 100 W<sub>P</sub>. The most popular package is the 50-60 W<sub>P</sub> module [4]. The package consists of PV module(s), battery pack, charge controller, light bulbs, and other required accessories. The price of installation labor, marketing, permitting, administrative overhead, and profit are included in the package cost. In Bangladesh a PV system costs \$4.88 per PV module W<sub>P</sub>, whereas, in the USA the cost is \$4.94 per PV module W<sub>P</sub> [5, 6]. Even though, PV system applications and market operations in Bangladesh and in the USA are different, the prices are very close to each other. Fig. 1 shows a typical SSPVS powered household in Bangladesh.

### III. Survey Methodology and Data Collection

The authors visited remote locations in Moheshkhali and Ukhiya under Cox's Bazar district and Rajvila under Bandarban district to survey small-scale photovoltaic system (SSPVS) users. Forty household users and nine cooperative users participated in the survey. Cooperative PV systems were funded by government to improve the social lives in the rural areas. All forty households used to use kerosene before they bought PV systems. Only one 20

$W_P$  system installed seven years ago was not in service. Six owners reported problems with the battery pack and two owners had issues with the controller. Ten household owners wanted more battery storage capacity for cloudy days whereas, current PV systems only support three cloudy days. All owners except one said they would buy a SSPVS if needed.

Most common electrical loads are light bulbs, mobile chargers, small dc televisions, and dc fans. A photovoltaic (PV) system over 65  $W_P$  can support a fan, along with light bulbs and a PV system over 100  $W_P$  can support a television along with light bulbs and a mobile charger. Fig. 2 shows a photo of survey activity at a cooperative office in Moheshkhali, Cox's Bazar that is powered by a PV system.

Average and median household incomes for SSPVS owners are \$2063/year and \$1650/year, respectively. The minimum and maximum incomes are \$375/year and \$7500/year, respectively. The average expense on kerosene was \$54.32/year/household, which is only 2.63% of the average income. Sixteen households have existing grid connected electricity and others are on average 2.15 kilometers away from a power line. Households with electricity connection cannot rely on it during the peak hour when they need it the most for household activities and children's education. They solely depend on photovoltaic systems during this crucial period of the day. SSPVS size varies from 20  $W_P$ -to-150  $W_P$  with an average of 62.25  $W_P$  and a median of 60  $W_P$ . Table I shows average, median, minimum, and maximum SSPVS size, cost, years in service, and distance from a power line.



Fig.1. A small-scale photovoltaic system in use.



Fig. 2. Survey activity

Table I: SSPVS size, cost, years in service, and distance from power line

	Size (W <sub>p</sub> )	Cost (\$)	Service (Year)	Distance* (km)
Average	62.25	332	4.37	2.15
Median	60	313	3	0.75
Minimum	20	38	0.1	0.4
Maximum	150	1000	16	11

\*Does not include users who have grid connected electricity.

A 60 W<sub>p</sub> PV system cost \$313 with all accessories and installation. With an interest rate of 12% for 36 months, the monthly payment is \$10. Average kerosene expense is \$4.52/month. The extra payment on SSPVS is only \$5.48/month for three years. After this period, the owner will receive free clean light for the lifetime of the system.

Authors visited nine cooperatives including two schools, three temples, one mosque, one clinic, one hostel, and one social office. Seven of them had grid electricity connection, one had generator/kerosene, and the other one had candlelight before they received PV systems. Religious places like mosques and temples expressed profound satisfaction about SSPVS because they could call for prayers on-time, worshipers could listen to sermons without interruption, and outside light bulbs improved the safety and security of the premises. In the hostel, students now have a clean light source to study. In the clinic, service providers can continue their work without interruption. In the school, teaching does not have to stop during a cloudy day.

#### IV. Socio-Economic Impacts

Human Development Index (HDI) encompasses three dimensions—long and healthy life, knowledge, and a decent standard of living. HDI was created to emphasize that a country’s development not only measured by its economic growth but also its people and their capabilities [7]. Fig. 3 shows the relationship between HDI and per capita electricity consumption by country. This is not a coincidence that access to electricity and HDI are directly related. Rural households in developing countries adopt to kerosene lamps to satisfy their lighting needs. They do not receive enough luminance for studying and/or for any productive work.

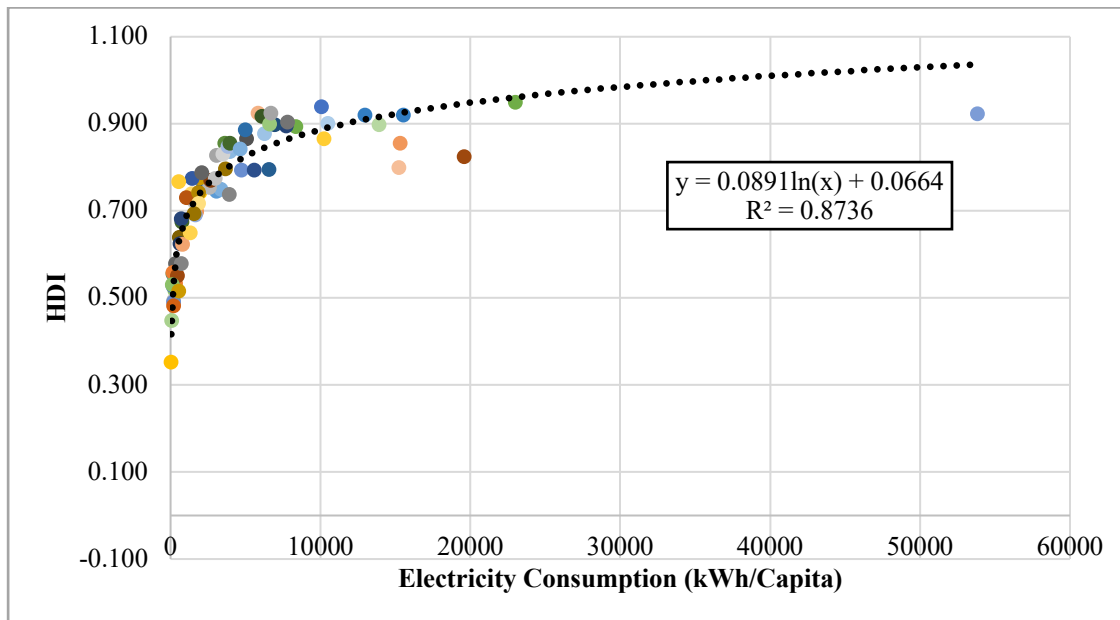


Fig. 3. Relationship between HDI and electricity consumption

A theoretical model developed by Kanagawa and Nakata shows that electricity access influences significantly socio-economic factors such as health and education. These two dimensions have substantial ripple effects on economy, gender equality, and environment [8]. This model also shows that literacy rate could be improved more than 10%



with the access to electricity. A field study is required to validate the theoretical framework. This paper studied the socio-economic impacts with empirical data. Household users mention the followings socio-economic impacts of SSPVS:

Education:

- Enough clean light to study;
- Free from drudgery work and more time to study;
- More girls are going to school;
- More parents want their girls to stay in education;
- No interruption of electricity while studying;
- Children are more aware of world affairs;
- Children have high motivation to study.

Health/Hygiene:

- No more black smoke;
- Reduces exposure to hazardous pollutants;
- Women do not have to deal with dirty kerosene lamps;
- Cleaner clothes and books.

Social/Recreation:

- Family times are more fun now with clean and reliable light.

Security/Safety:

- Family members feel safer and more secure due to available light inside and outside of the house.

Income:

- Did not see any direct change.

Fig. 4 shows field survey results. 90% of participants experienced an improvement in children’s education and 83% in family hygiene. Social/family recreation and security/safety also improved. There was no direct improvement of income unless SSPVS was used for business purposes.

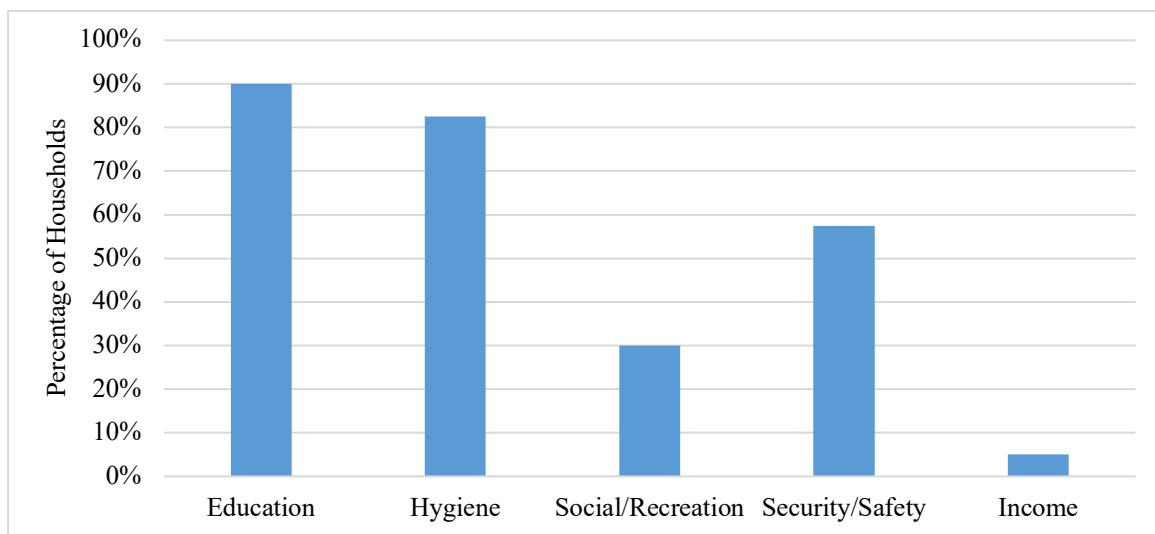


Fig. 4. Socio-economic improvement index (sample size = 40)

Sustainability of a technology depends on affordability, public acceptance, and availability. Appropriateness of a technology is defined by the suitability to the social and economic conditions of the geographic area in which it is applied. Field study data showed that SSPVS is an appropriate and sustainable technology for rural areas of Bangladesh. This technology is creating a favorable environment for children’s education especially for girls who never had a chance to dream for higher education. Parents are encouraging girls to do better at school and earn higher degrees. Fig. 5 shows that girls are studying under PV electricity in Ukhiya, Cox’s Bazar.



Fig. 4. SSPVS providing clean light for girls to study

#### V. Conclusion

This field study aimed to reveal socio-economic impacts of small-scale photovoltaic systems in rural areas of Bangladesh. The empirical data shows that access to clean electricity transformed lives in terms of education, family hygiene, safety/security, and social/family recreation. 90% of the households surveyed have seen improvement in their children's education. Parents are more positive than ever on girls' education. 83% households have seen improvement in family's health and hygiene. Education and health will have a direct impact on the third dimension of Human Development Index, which is standard of living. Together, people in these rural areas will contribute to the overall development of the country with better education, health, and productivity.

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BAASANA 2018 International Conference  
Resilience as a Predictor of Variations in Freshmen Retention

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Abstract:

As institutions of higher learning struggle to retain their incoming freshmen beyond the first year, it is posited that "at risk" students are more vulnerable to departure for financial reasons among other stressors. This mixed method study seeks to better understand the relationship between resilience and variations in freshmen retention, of students at a predominantly Catholic and Vincentian University in Queens, New York. An examination of how resilience impacted retention was explored through a focus group. Implications of this research is intended to provide insight to advisors and faculty working on prospective freshmen students. The study looks at the ability of freshmen students to navigate beyond their first year and the adaptability of institutions of higher learning to engage, engage, and engage. The implementation of resilience training will be advantageous to college/university advisors and faculty, as they grow in their understanding of the need to nurture resilience among their freshmen through engagement, developmental advisement, and faculty involvement. The research has shown that as levels of student involvement/engagement increase, so does student resilience and retention in higher education.

*Keywords: resilience, retention, persistence, engagement*



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“Making the world work for all humanity.”

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I'm delighted to have this opportunity to introduce you to the Whole Earth Design Project. I trust you will find it thought-provoking and worthwhile, and perhaps even something you would like to support.

The objective of the Whole Earth Design Project is to design, in cyberspace, an ecologically and environmentally sustainable economic system capable of providing every individual on the planet with all of life's essentials as a template for the transformation of the economic system in the real world.

We humans have learned a lot about this planet and how it works. Collectively, down through the ages and piece by piece, we have assembled a deep understanding of this planet's physical, chemical, biological, and electromagnetic forces. As a result, we are capable of the most dazzling technological achievements. You might even say that we have taken over control of our own evolution. Because we know so much about the planet and how it works, there appears to be nothing we cannot do once we decide to do it. But as impressive as our accomplishments may be, it is troubling to consider what we appear determined not to do, that is, feed the hungry, clothe the naked, house the homeless, and care for the sick, despite the fact that, in our anything-is-possible era, such human suffering is easily assuaged. But with all we have learned about this planet, we have still not figured out how to live on it together in peace and harmony.

Back in the sixties, it was the brilliant futurist R. Buckminster Fuller, inventor of the geodesic dome, who never ceased to remind us that we are all passengers and crewmembers alike aboard Spaceship Earth. His lifelong efforts were directed toward his dream of “making the world work for all humanity,” which is clearly not now the case. With the Whole Earth Design Project, we have taken up Fuller's dream as our cause.

With the world sinking deeper and deeper into the depths of economic dysfunction, it is urgent that we come to understand the cause of our despair. Fortunately, Fuller has offered a clue. In the sixties, he expressed the opinion that 60 percent of the jobs in the United States, the world's most advanced economy, produced nothing of life-sustaining value. Today, fifty years later, it feels like 80 percent. It is this dichotomy of the workforce that suggests the cause of our dysfunctional economic system.

It is little understood or appreciated that we are living in a society that is shaped by the interaction between two systems. We have an economic system where essential goods and services are produced and distributed. And we have a more powerful and influential financial system that controls the economic system. In developed countries, the productive economic system employs roughly one worker in five, while the other four workers are employed in the care and feeding of some aspect of the financial system. The problem is that these two systems are at sharp odds with one another in the purposes they were created to serve. The purpose of the economic system is to provide for the needs of the people. The purpose of the financial system is to exploit the economic system for financial gain, resulting in an economic system in a shambles and an extreme level of inequality as represented by the “one per cent.”

We are convinced, therefore, based upon the disproportionate share of the workforce devoted to non-productive financial activity and the associated waste of human and natural resources, that the culprit behind the economic dysfunction is not in the economy itself but in the financial system that controls it. We have enormous needs and an abundance of resources to meet those needs but are unable to match the two. Why not? Not enough money is the usual explanation. This is not true, of course, because the financial system is drowning in money, so much so that the wealthy are having a difficult time deciding what to do with it all. What we are looking at, therefore, is not a lack of funds, but a failure on the part of those who control the financial system to exercise any sense of justice, morality, empathy, or humanity.

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Confronted with a growing torrent of problems (climate change, pollution, resource depletion, official corruption, terrorism, wealth and power concentration, and economic dysfunction), the search for a solution has taken on a note of extreme urgency.

The Beatles, in their 1968 “White Album,” sang:

You say you want a revolution.

Well, you know, we all want to change the world.

You say you got a real solution.

Well, you know, we’d all love to see the plan.

It is the objective of the Whole Earth Design Project to produce just such a plan, one that will prove to be the real solution we are all hoping and praying for, the roadmap that will lead us to that wonderful world in which we all learn to live together, a grand new vision to which we can all aspire.

Although this project is still in its formative period, the essential framework has been established. The plan is to pursue its objective in four stages, with each stage laying a solid foundation for the next. Here are the four stages as presently planned:

*STAGE I: Confirm the project’s feasibility.* Before proceeding with the massive research and design work at the heart of this venture, it is prudent to confirm that the project’s objective is actually feasible. In other words, do we possess sufficient human and natural resources, along with the appropriate scientific knowledge and technological expertise, to ensure that everyone on the planet has access to all of life’s essentials? For the answer to that question we will turn to the experts. We have identified ten economic sectors as essential: Clean and safe air, water, food, clothing and shelter, in addition to access to communication, information, transportation, health care, and energy. We have already identified the individuals and organizations most experienced and knowledgeable about each of those sectors, and we will form ten workgroups consisting of researchers who will draw upon the knowledge and expertise of these experts by asking each to make a plausible estimate of the percentage of the population that presently enjoys access to each essential, and what, in their best judgment, would be required to meet the goal of making that necessity universally available. Ordinarily, such an estimate would be expressed in trillions of dollars, euros, yen, or renminbe. Instead, we will calculate the cost in units of labor. How many workers laboring how many hours/months/years would be needed to meet each essential’s objective of universal access. Then, based upon a consolidation and integration of the authoritative estimates assembled by the ten workgroups, we expect to proclaim, with the fanfare from a million metaphoric trumpets, what the facts will have clearly revealed: *There is more than enough for everyone! The project’s objective is feasible!* Further, that the abundance of available human, natural and technological resources makes it possible, when liberated from the constraints of a financial system, to provide every individual on the planet with all of life’s essentials; that an all-hands worldwide emergency effort could bring the planet’s entire population up to a humane and sustainable standard of living in just a few short years; and that the maintenance of that standard would require as little as the equivalent of a day of work a week from each of us as our individual contributions to the smooth functioning of the economic system.

*STAGE II: Fill in the details.* Utilizing existing Geographic Information System (GIS) software, we will create the framework for a virtual world in cyberspace to serve as a template for the organization of a new economic model in the real world. We will begin by geographically locating needs and resources by continents and regions, collecting the gross statistics from various government, trade, professional, academic, and philanthropic organizations. Then, with the aid of a worldwide army of volunteer information gatherers drawn to the design project by its dramatic declaration of possibilities, we will dissect those gross statistics by locating needs and resources down through increasingly detailed geographic layers until they identify and embrace the entire human population, city by city, town by town, neighborhood by neighborhood, home by home, and individual by individual, resulting in what will amount to the first detailed Earth-wide census.

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STAGE III: *Complete the winning design.* The design work will be based on the assumption that it is being prepared for the world toward which we are all striving, one where we act as a global family, looking after one another, sharing burdens, celebrating life together. Next, it will assume an entirely new operating system in which violence and money are no longer elements of control. Therefore, no armies and no banks, and none of their offspring or various instrumentalities. Then, without regard to any matters financial, political, or legal, but with a laser-like focus on the simple and direct objective of providing everyone on the planet with all of life's essential goods and services, we will start connecting resources with needs by way of the shortest and most direct routes. By so connecting the "resource" dots with the "need" dots and running simulations to demonstrate the potential for efficiency, out of the design project will emerge an economic model so dramatically superior to the one we have now that, if adopted, it would improve the lives of 99.99 per cent of the world's population. This begs the question: If it can be shown that this is so, what could possibly prevent the overwhelming majority of the population from adopting that system?

STAGE IV: *Promote the winning design.* By now the Whole Earth Design Project will have become a movement, with a capital M, supported by the millions who have participated in assembling the data. Call it the Whole Earth Movement. Or call it the Coalescence, the great coming together of all humanity. But give it a name that can serve as a banner under which all organizations and individuals trying to make this a better world can march in oneness of purpose. Then, give this new movement a symbol, a logo, that can be used to express support. The early Christians had the fish symbol and now the cross, Jews have the Star of David, Churchill used the V for Victory sign, the anti-war movement had the peace sign, and the Nazis had the swastika. Here's a suggestion for the Whole Earth Movement. What does it mean? One version of its intended meaning is that a united world [()] is better than [>] a divided world [>()]. Encourage those who agree with that sentiment to draw it in the sand, wear it on a button, stick it on a bumper, put it on a T-shirt, and include it in their email messages and tweets. Next, armed with all the facts and a powerful message, we will launch the fiercest public relations, promotion, publicity and proselytizing campaign the world has ever seen. Let it be known that "beyond the shadow of a doubt" under the proposed economic system there will no longer be cause for economic anxiety. No one will lose their home. Everyone will have enough to eat. No one will die of malaria. Everyone will have clean and safe water to drink and air to breathe. And so on, through the whole list of life's necessities. By now we will have developed the project's virtual world in cyberspace and made it available to the public for inspection via the Internet in much the same way that Google Earth is available to the public. The public will be able to zoom in anywhere on the globe for a closer look at local conditions or pull back for the larger picture. In this way the world can follow our design progress. And by now we will have also developed an avatar program with which individuals can represent themselves while exploring their possible roles in the new economy. The beauty of the Whole Earth Design Project and the key to its success is that each individual's participation will be discussed and agreed upon and then foreshadowed in the project's virtual world. Thus, the new society will be collectively designed in cyberspace before being recreated in the real world, having had all the details, including each individual's role, worked out agreeably in advance. There will be much exciting and rewarding work to do during the one-off period of global reconstruction to bring everyone up to a humane standard of living. Thereafter, there will suddenly be so little work that for many adjusting to a life of leisure may prove to be the greater challenge.

When finally the vast majority of the population (99.99 percent?) has signed on to the program, we will set a date, have a fantastic planetary celebration, and then get to work. There's an entire planet that needs healing and a whole new world of possibilities ready to be explored. We will launch this project when we succeed in gaining the necessary support and resources. As educators and academics, I trust you will find this of interest and give serious consideration to this heterodoxian effort to provide access to all of life's essentials to all of Earth's inhabitants. This is going to become a unique and massive undertaking of the greatest importance, and we are hoping for a wide range of participants.

Meanwhile, if you happen to know any multi-millionaires or billionaires who really, really, REALLY want to change the world and don't know how, please have them give me a call.

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**Abstract:**

Employing Dynamic Conditional Correlation (DCC–GARCH) (Engle, 2002), this paper compares and investigates volatility spillover effects between oil price shocks and stock markets in the U.S., U.K., Canada, France, Japan, Germany, and Italy (G7) and Brazil, Russia, India, China, and South Africa (BRICS) using daily data from Jan 1, 1992 through Jan 30, 2015. It reveals the positive spillover effects between oil stock markets in both advanced and emerging countries. Especially, the recent financial crisis around 2008 impact the dynamic conditional correlations in both G7 and BRICS. Moreover, spillover effects between oil markets and stock markets are significantly impacted by the economic conditions, such as financial crisis, housing bubble, tech bubble, and economic recovery, while oil importing and exporting countries have no significant different spillover effects.

**Keywords:** volatility spillover; DCC-GARCH; oil markets; stock markets; BRICS.

A Machine Learning Approach to Reduce False Positive Alarms  
Generated by Data Breach Detection Processes

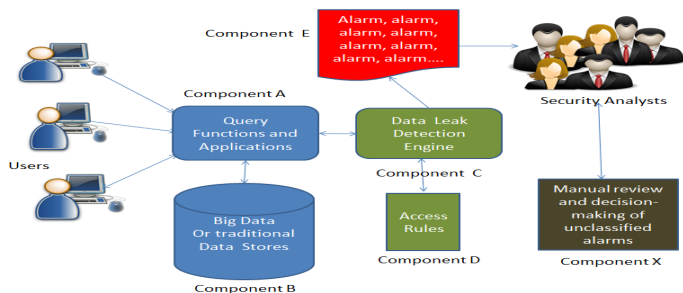
**Pedro R. Vasseur**  
**Pace University**

**Abstract**

The unauthorized use of sensitive data is a major security risk. Customers whose information is kept by enterprises are vulnerable if protective measures are not taken. As a result, many organizations have installed Data Leak Detection tools, (DLD) – a.k.a. Data Breach Detection - that monitor the access of their internal data repositories. An alarm record is generated whenever any anomalous access behavior is observed by a DLD engine. However, the alarm records need to be analyzed in a timely manner by security experts to determine if indeed they are malicious or benign, and then to act accordingly. This study aims to improve the quality and reduce the time of this process by proposing a prototype based on an iterative approach that confirms the nature of the alarms.

**I – Introduction**

The concept of false alarms has been a recurring problem for researchers, scientists, and statisticians for many years. In recent times, the problem has also become very important for those involved in handling the resolution of cyber attacks. False positives that are produced as a result of security monitoring systems have deleterious impacts on individuals and organizations, as described by Tjhai<sup>1</sup> et al., in their work “The Problem of False Alarms: Evaluation with Snort and DARPA 1999 Dataset [1].” But, there is a persistent trend in the utilization of security breach detection systems to favor the occurrence of false positives in order to minimize the occurrences of false negatives, and this trend is supported by the belief that allowing a false negative - allowing a real danger to go unnoticed - is more pernicious to an organization than having to deal with an excess of false alarms. This tendency generates more false positives than true positives, and as a consequence, the experts that need to confirm the nature of alarm are dedicating time and energy to handle a bogus event which otherwise could be used for addressing a true alarm. These false positive errors have the added dimension of being generated in large volumes as a result of the constant security monitoring of network traffic or internal data access. “Data loss, i.e., the unauthorized disclosure of sensitive information from a corporate network or a database [2]”, is a major threat for organizations. Organizations can lose their competitive advantage if confidential information is stolen. Moreover, besides the legal and financial risks, data breaches can negatively affect customers’ perception towards a company’s image by decreasing its reputation. As a consequence, practical research has focused on the detection of false alarms that occur either as a result of a) external cyber attacks, or b) malicious internal access of data, with the former research having a larger share of investigative work than the latter. The most common false positives exist in products such as network intrusion detection/prevention, endpoint protection platforms, and endpoint detection and response tools” as B. Violino has expressed in his work [3]. Data leakages are typically propagated by insider threats, as Babu and Bhanu have pointed out in their research paper “The most dangerous threats faced by organizations are insider attacks. Since insiders are aware of the underlying systems, handling insider attack is a most challenging task since it can be intermingled with many non-malicious, accidental breaches. The volume of violations by insiders on private cloud repositories is higher than the traditional systems’, as the attack vector and scope is higher [4]. The research effort has focused on minimizing the rate of false alarms by applying complex algorithms that try to determine the nature of a breach based on syntactic or semantic patterns as the violation is taking place. The problem area is shown in **component X**.



**Figure 1 - Current state of DLD alarm handling.**

This paper describes an approach, in terms of a prototype, that can make more efficient and effective the **manual** process of inspecting large volumes of false alarms caused by anomalous internal events reported by DLD engines. This paper does not focus on Intrusion Detection Systems which aim at discovering external attacks. This approach addresses a specific subset of the general data breach problem: every alarm should be subject to *a posteriori* inspection by data security experts whose time to handle them is limited by time or availability of personnel, or both. Also, it addresses the inter-mingling of a large number of false positives with real alarms that distract the security experts from concentrating on determining legitimate security alerts. One refers to this type of distraction as “false alarm fatigue,” bringing to memory the old story of “the boy who cried wolf.”

As one studies research literature about this problem area, one finds that the increasing cost of the confirmation of the true nature of a generated alert keeps rising as organizations try to grapple with the increasing volume of alerts. What is observed is that subject matter experts are charged with inspecting reports of alerts generated by automated systems. Intrinsicly, the risk exists of missing malicious events as they are intermixed in this large volume with non-malicious records. As already pointed out by Bradbury, in the Prelert Behavioral Analytics report cited above, it is very challenging to scrutinize all the anomalous activity to select these events “and even if security pros do find anomalous activity, it can be difficult to scan through all of it and work out which of it needs the most attention.” Judging from the findings of this report, this is an existential problem for security practitioners. A third of respondents to the survey complained that it was too difficult to distinguish normal from the abnormal activity.

## II – Related work

In the past few years, research reports have discovered that 50% of IT administrators and security staff surveyed indicate that too many false alarms are “keeping them from being confident on breach detection [5].” The current solutions to address the problem of the high volume of false positives have consisted in a variety of approaches to improve the *detection* algorithms in order to reduce the rate of false positives in order to increase the accuracy of DLD applications. One of the proposals is an elegant framework that uses an anomaly-based solution that trains a model of normal behavior and flags any deviation from the model as a suspicious activity. It can find unknown attacks but may have a high false positive rate. There are other proposals such as the ones made by M. Karwaski [6] and Zhihong Tian et al. [7] that address the issue of classifying and confirming alarms *a posteriori* for subsequent inspection, but they are based on Intrusion Detection Systems, and have not been leveraged to include the internal data breach scenarios as this paper does. Yet, current solutions are defective because they do not *confirm* the true nature of alarms that are generated. Most data breach engines concentrate on making the determination of a violation of data access as the *event takes place*. Some solutions have been proposed where the reduction of false positives is maximized by using syntactic, semantic, or a combination of both techniques, in attempting to determine if an anomalous action is being performed on the data. The most common deficiencies of DLD programs are

- I. The lack of confirmation of the true nature of alarms based on the application of the access rules
- II. The deficiency in not providing information about the context of the nature of alarms,

III. The lack of an automated feedback mechanism to re-train the detection and confirmation process

IV. The minimal application of more precise DLD inspection of alert of Big Data repositories

When one examines the details of the first deficiency - the lack of confirmation of the true nature of alarms based on the application of the access rules - one discovers that the lack of automated confirmation is a result of shortcomings in providing more precise information for the interpretation of data access violations. DLD applications would rather err on the side of creating false-positives due to less precise access rules. An example of an ambiguous access rule is a time restriction in terms of not allowing accessibility for certain individuals, or roles of individuals, during a certain period of time, e.g., users with the role of testers can only access certain tables between 8 AM to 6 PM every day. Any query invoked by a tester that starts a few milliseconds before or one millisecond after the specified time parameters will be considered a violation of this particular access rule and in turn, generate an alarm which is not totally true in nature. An analogy of this situation is that of a fisherman casting a large, fine net to catch as many fish as possible and as a result hauling many unwanted objects aboard besides the real catch.

In the case of the second deficiency - the lack of explanatory information, or metadata -hampers the security analysts' decision-making process by not providing a better understanding of the alerts' **context**, i.e. an authorized user executing a table query at an unauthorized time, and **urgency** i.e. criticality level of the data breach in terms of personally identifiable information (PII), or sensitive personal information (SPI). In part, this deficiency of insufficient content is attributed to a reluctance to include more complex logic in an algorithm that can provide more distinctive information about the context and nature of the alarm. The reticence to provide more clarifying information with the alert record is usually rationalized as follows: the extra logic needed to generate a more precise alarm record will elongate the process time required to confirm a malicious event within the constraints of the monitoring engine's inspection cycle, and therefore create a performance degradation of the automated process overseeing the querying functions. Unfortunately, according to Vavilis and other researchers of false positive problems, the current state of affairs regarding the information about alerts provided by existing anomaly detection systems is not very satisfactory, especially when addressing Big Data repository access [8].

In the case of the third deficiency - the lack of an automated feedback mechanism to the detection process, there are proposals that introduce generalized approaches that adjust the determination process as a result of the subject matter experts' confirmation of the nature of a new type of alarm. The comprehensive framework of Costante et al. [9] addresses the DLD as well as the Data Loss Prevention process in order to enforce the real-time interaction of the security analyst as the alarms are detected by the engine. In this scenario, the analysts are given more tasks to perform:

- 1) To confirm whether the alert is true or false,
- 2) To initiate a feedback record to the DLD,
- 3) If the analyst determines the false alert is associated with a malicious action, to enforce it, i.e., automatically create or modify rules based on the alert's values.

This is an elegant and well-defined proposal that attempts to achieve the reduction of false alerts *as they occur* and also improve the effectiveness of the process, but it runs the risk of losing efficiency by the addition of higher costs in terms of introducing more manual tasks to be performed by the security staff as they try to meet security service deadlines. The framework is based on experimentation with traditional relational databases and does not address Big Data environments, yet it contains components that can be leveraged to address non-relational, semi-structured more voluminous repositories like Big Data.

As far as the fourth deficiency is concerned, the minimal application of DLD to Big Data environments – one notes that there is extensive work on false-positive reduction of anomalous data access that has produced several models and frameworks [10], *but* the paradigm that is commonly used is the one that strives to obtain the maximum reduction of the false alarms rate within the internal components of the DLD engine itself. The fourth deficiency becomes even more poignant as one studies recent scholarly article on the state of research on DLD of Big Data internal access. One discovers that the risk of bypassing alarms is not being addressed in a consistent manner. It is argued by Damiani et al. that because of the nature of the Big

Data file architecture there is an inherent data redundancy that could act as a catalyst for Big Data breaches. For instance, as the Hadoop File Distribution System works, it replicates sensitive and non-sensitive data components several times over separate data clusters [11]. This redundancy of data phenomenon is done mainly for operational performance purpose: the architecture used in the Hadoop file distribution system is predicated on the utilization of many servers collaborating in an orchestrated fashion to provide the data requested from any available node

There are DLD prototypes that have achieved a high degree of rate reduction of false positives [12], but they all have done it with the risk of increasing the rate of false negative incidences. Paradoxically in the Big Data environment, even if the false positive rate is minimized during the detection process, the high volume of transactions examined would tend to degrade the operational performance of the engine. In this section, one attempted to leverage previous research on the false positive confirmation process from Chandola et al. 's survey work [13] while addressing the four deficiencies. Their paradigm has been a great influence on this research to establish Big Data security practices for containing disclosure risks generated by data queries, as well as leveraging their algorithms *a posteriori*, i.e., subsequent to the automated process of detection. One leverages this concept as one considers that the subsequent effort can be more effective and efficient than efforts that attempt to minimize the occurrence of false positives within the engine, i.e., as the events are taking place.

The current literature indicates that false alarms are a problem not only because they consume extra personnel's time, but also because they can distract these experts from properly addressing legitimate security alerts, as asserted by B. Violino [14]. The increasing manual effort of maintaining security reviews is not efficient, as the cost keeps rising in hiring expert personnel that is needed to sift through many false-positive instances. It is not effective either because of the danger of missing a malicious action that is missed in the large volume of this "noisy" output. One survey that was helpful in understanding the false positive problem from the external attack point of view that can be used in assessing the internal threat angle is the one by A. Mokarian et al. [15]. The authors explain that the "false positive rate (FPR) also known as false alarm rate (FAR), refers to the proportion that normal data is falsely detected as attack behavior." In contrast, our paper examines the attack problem as an anomalous and possibly malicious internal data access, not as an external cyber-attack such as a SQL injection.

		Reality	
		Benign	Malicious
Detection result	Benign	True Negative	False Negative
	Malicious	False Positive	True Positive

Figure 2 - Reality vs. Assumed detection results

$$\text{False Positive Rate (FPR)} = \frac{FP}{FP + TN}$$

$$\text{False Negative Rate (FNR)} = \frac{FN}{TP + FN}$$

$$\text{True Positive Rate (TPR)} = \frac{TP}{TP + FN}$$

$$\text{True Negative Rate (TNR)} = \frac{TN}{TN + FP}$$

$$\text{Accuracy} = \frac{TP + TN}{TP + TN + FN + FP}$$

$$\text{Precision} = \frac{TP}{TP + FP}$$

Figure 3 - List of True and Positive Alarms ratios and relationships

Based on the relationships and ratios just described, there are two key scenarios that can occur depending on the configuration of the detection algorithms: a) **Scenario A**, a large False Positive Rate can produce a poor



performance of the Intrusion Detection System and, b) **Scenario B**, a large False Negative Rate can render an organization an easy prey to attack or sabotage. Studying the literature on this subject, one discovers how organizations tend to favor scenario A versus scenario B. The rationale for this phenomenon merits a separate study which could shed more light on the use, or misuse, of detection engines and perhaps serve as a basis for further practical research in that area. One can speculate that this phenomenon is based on either fear of being complicit in helping create a Scenario B or ignorance of the lack of effectiveness and efficiency of Scenario A, but the side effect has the unintended phenomenon called “the cry wolf effect” to dealing with alarms.

**III – Current shortcomings in attempts to reduce the false positive rate**

The goal of a detection system, regardless of its monitoring external or internal threats, is to achieve a large true detection rate and a small false alarm rate. An important aspect about evaluating different algorithms which aim to reduce bogus alarms is that reducing just false positive rates is not sufficient. The challenge in utilizing algorithms that attempt to minimize false positive rates is that it is not enough. Therefore, the “ideal” paradigm is to develop an algorithm that can minimize false alarm rates to increase the accuracy of the system. The above-mentioned survey is useful because it lends support to this paper’s assumption that attempting to achieve the ideal paradigm within the detection engine is almost impossible. Even if a low rate of false positives is achieved, the inherent large volume of big data traffic can produce a proportionally high number of false alarms that still are in need of manual review as depicted in the chart below, rows 8 through 10.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
	Sample of alarms	Instances of TP	Instances of TN	Instances of FP	Instances of FN	%TP	%TN	%FP	%FN	TPR= TP/(TP+FN)	TNR= TN/(TN+FP)	FPR= FP/(FP+FN)	FNR= FN/(FN+FP)	Accuracy= (TP+TN)/(TP+TN+FP+FN)	Precision= TP/(TP+FP)
1															
2	100	10	30	50	10	0.100	0.300	0.500	0.100	0.500	0.375	0.833	0.167	0.400	0.167
3	200	40	80	60	20	0.200	0.400	0.300	0.100	0.667	0.571	0.750	0.250	0.600	0.400
4	500	350	50	50	50	0.700	0.100	0.100	0.100	0.875	0.500	0.500	0.500	0.800	0.875
5	1,000	100	700	100	100	0.100	0.700	0.100	0.100	0.500	0.875	0.500	0.500	0.800	0.500
6	2,000	1,580	380	20	20	0.790	0.190	0.010	0.010	0.988	0.950	0.500	0.500	0.980	0.988
7	3,000	2,370	570	30	30	0.790	0.190	0.010	0.010	0.988	0.950	0.500	0.500	0.980	0.988
8	100,000	79,000	19,000	1,000	1,000	0.790	0.190	0.010	0.010	0.988	0.950	0.500	0.500	0.980	0.988
9	500,000	445,000	45,000	5,000	5,000	0.890	0.090	0.010	0.010	0.989	0.900	0.500	0.500	0.980	0.989
10	500,000	485,000	5,000	5,000	5,000	0.970	0.010	0.010	0.010	0.990	0.500	0.500	0.500	0.980	0.990
11	1,000,000	970,000	10,000	10,000	10,000	0.970	0.010	0.010	0.010	0.990	0.500	0.500	0.500	0.980	0.990
12	1,000,000	997,000	1,000	1,000	1,000	0.997	0.001	0.001	0.001	0.999	0.500	0.500	0.500	0.998	0.999

**Figure 4 - Sample sizes and their true and false values**

As it can be seen by the example above, using an algorithm that can achieve a 97% proportion of true positives in the sample, with 0.980 accuracies and a 0.990 precision if the volume of the sample is a half-million, there will be five thousand false positives (see row 10 in figure 4). Even if the “ideal” algorithm could achieve 99.7% proportion of true positives in the sample, with 0.998 Accuracy, and 0.999 precision if the total volume of the sample reached a million, there will be one thousand false alarms that would need to be confirmed. In this study, one is proposing a more efficient and effective *a posteriori* process to minimize the concomitant risk and expense of excessive false alarms. Future work can be done leveraging this process to improve “after detection” processes and be able to approach 100% effectiveness while keeping a high level of efficiency. Organizations do not deploy and fine-tune the DLD tools properly in order to reduce costs. The security rules are not configured correctly, or they are left to default to “out-of-the-box” settings which are too general in scope for refined detection.

Another aspect of this problem is that Big Data architecture weakens data protection in general. The techniques for improving the high-availability of Big Data tools replicate the data in several different places; they increase the redundancy of data and therefore create poorly protected copies of data. If DLDs monitor these replicated areas of vulnerability, the volume of alarms generated can increase according to the replication factor.



This methodology used an initial training data set consisting of a sample of alerts that had been vetted and confirmed by a subject matter expert. This training data set was ingested by the decision tree model using the Rapidminer to learn the behavior of initially scored alerts. Since one worked with the scoring of binomial results, a decision tree is appropriate. The required heuristic can be selected by a *criterion* parameter. The criterion parameter has a crucial role in the methodology: it is the target of precision adjustments if the results indicate a major deviation in the accuracy of the decision tree. The machine learning **Component F** ingests a training data set. This training data set is a supervised classification set, i.e., the data set contains a sample of representative alarms, either true or false, which have been scored by subject matter experts. The training set is input to the machine learning model in order to “learn” the behavior of the alarms. Subsequently, new alarm records generated by the detection system will be fed unscored into the model. One then allows the model to classify them based on what it has just learned. The training dataset was a segment of a security log report that consists of seven columns. The first six columns are possible predictor variables that are candidates for confirming the value of the seventh variable: whether it is a true or false alarm. The scored value of each row as a true or false alarm is already provided in the seventh column.

Timestamp	Requestor	Role	Component Accessed	Request type	Violation type	Real nature of the alarm (True or False)
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**Figure 6 – Example of the monitored elements for the data-at-rest use case**

The next component, **component G**, generates the file of scored and prioritized alarms out of the model for manual inspection. This component will report any previously unseen pattern as false, but flagged with a confidence level value of “?”, i.e., questionable and in need of manual confirmation. The analyst can inspect and take action on the confirmed and prioritized true alarms first. Next, one can examine the variable pattern of any questionable alarm, and manually score it as true or false based on his/her expertise, and then insert it as part of the training dataset. Note: It is in this component’s logic that the prototype will continually increase the knowledge of the training process: it integrates the organization’s decision-making expertise of the analyst with the model’s training set. The training data set becomes the dynamic repository of the subject matter expert knowledge on what is considered true or false alarms. It will evolve in its validation expertise with every iteration of the process, and therefore decrease the dependency on multiple analysts’ time and effort. **Component I**, shown in figure 5, is the logic that compares the training data set key predictor variables against the list of access rules. If the comparison indicates that there is a missing entry in the access rules list of a TRUE score in the training set, a communication is sent to the detection engine that there are newly discovered patterns that have been confirmed by the security analyst, and that should be considered as part of the monitoring rules (Component I uses a formula described below in figure 7 that checks for a mismatch between a) the set of variables in each of the individual rules list against, b) the predictor variables and their corresponding score in the training dataset of the machine learning model. A notification record will be triggered a) if a new pattern has been discovered by the machine learning model that is a questionable entry, e.g., with a confidence level of ?/? , and b) It has been confirmed by the security analyst as a true alarm.

**For each entry in the training dataset with a score of TRUE**  
**For each entry in a current copy of the access rules list**  
**Compare the content of each key predictor independent variable in the training data set to its corresponding variable in the access rule list**  
**If the values are equal, continue with the next entry in the access rules list else**  
**If the values are not equal, generate a notification of a mismatch to the detection engine**

**Figure 7- Logic of Component I**

This study leveraged previous work of data-in-motion [18] and applied similar data mining methods to the data-at-rest use case. This prototype was vetted in the research papers called "Big Data False Alarms: Improving Data Leakage Detection Solutions[19]" and "A Generic Approach to Big Data Alarm Prioritization

[20]” Due to security concerns of providing real production security logs, one used test records to mimic the columns and values of a generalized DLP security log. The access rules for this study are pictured below.

Id	Role	Component	Component
User A	Analyst	Table 1	Element 1
User B	Business	Table 2	Element 2
User C	Administrator	Any table	Any table

**Figure 8 - Access rules for the second prototype of work: data-at-rest**

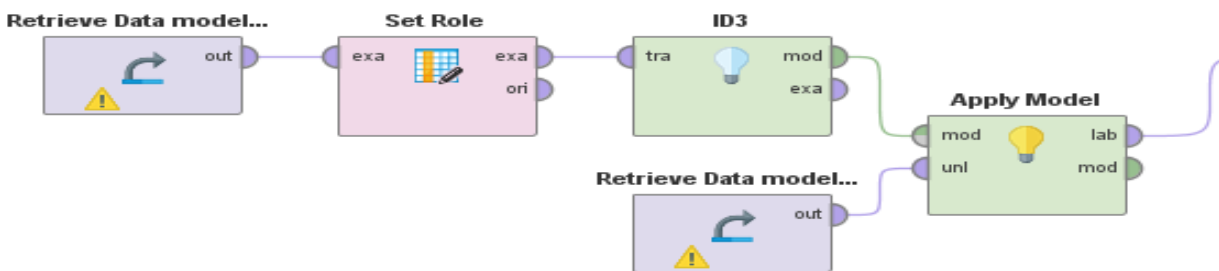
The Rapid Miner application was chosen because of its flexibility in capabilities of validation decision tree analysis and using flexible input and output in Excel formatted files. The challenge is that no obvious relationship exists within the data records and each false and true alarm reveals no clear pattern. One explores which columns create precedence over others in determining the best scoring, and which combination will eventually result in the confirmation of false alarms when new instances are given to the model’s algorithm. The model is tested with validation datasets for subsequent analysis. The difference between the validation and the training data sets is the validation set is not scored, i.e., a target column with no content. With both the training data set, one ran an analysis in the ID3 decision tree model, result below.

User	Alert Total	% of Total (104)
<b>Analyst</b>	74	69.24%
<b>Business User</b>	28	26.93%
<b>Administrator</b>	4	3.48%

**Figure 9 - Breakdown of user activity in the security training log**

Without adjusting column weights, one initially let the model determine the results of the scoring. Another segment of validation test data was then fed into the model. Two columns were then chosen for the test set, **Role, and Alarm**. The data was run through the ID3 algorithm. Using two sets of test data a design process was set up in the ID3 decision tree model in order to have the new data learn from the older data. This would allow the output of the process to show which data caused a true or false alarm based on criteria such as **Violation Type and Requestor**. In this scenario, both User A and B attempted to access components Element 1 and Element 2 which caused a true alarm.

In resetting the model, the ID3 algorithm was again employed. This time making criteria changes to obtain more precise results. Parameters were reset to achieve correctness: **gain\_ratio** as a criterion, **minimal size for a split** of 2, **minimal leaf size** of 2 instead of 4, and **minimal gain** of 0.10



**Figure 10- ID3 Algorithm Diagram with Test and Production Data Sets**

The results provided a view in terms of confidence of the data.

Row No.	prediction(Alarm)	confidence(false)	confidence(true)
3	false	1	0
4	false	1	0
5	true	0	1
6	true	0	1
7	true	0	1
8	true	0	1
9	false	1	0
10	false	1	0
11	false	1	0
12	false	1	0
13	false	1	0
14	false	1	0
15	false	1	0
16	false	1	0
17	false	1	0
18	false	1	0
19	false	1	0
20	false	1	0

Figure 11 - ID3 decision tree model confidence ratio results of the tests

After this re-training session, the model learned the new relationship of the column-fields data set, and have the ability to apply it to a new validation data set that did not include the true and false alarm values.

ExampleSet (104 examples, 1 special attribute, 6 regular attributes)

Row No.	Alarm	Timestamp	Requestor	Role	Component...	Request ty...	Violation t...
1	false	Aug 8, 201...	User A	Analyst	Table 1	Select	Non-normal...
2	false	Aug 8, 201...	User A	Analyst	Table 1	Select	Non-normal...
3	false	Aug 8, 201...	User A	Analyst	Table 1	Select	Non-normal...
4	false	Aug 8, 201...	User A	Analyst	Table 1	Append	Non-normal...
5	true	Aug 8, 201...	User A	Analyst	Element 2	Select	No authoriz...
6	true	Aug 8, 201...	User A	Analyst	Element 2	Select	No authoriz...
7	true	Aug 8, 201...	User A	Analyst	Element 2	Select	No authoriz...
8	true	Aug 8, 201...	User A	Analyst	Element 2	Append	No authoriz...
9	false	Aug 8, 201...	User A	Analyst	Element 1	Select	No authoriz...
10	false	Aug 8, 201...	User B	Business user	Table 2	Select	Non-normal...
11	false	Aug 8, 201...	User B	Business user	Table 2	Select	Non-normal...

Figure 12- Scored output from the re-trained ID3 model

The figure shown above highlights the relationships between the fields **Component Accessed**, **Violation Type**, and **Requestor** in regards to the Alarm.

Component Accessed	prediction(Alarm)	Violation type	Requestor	Count of Component Accessed
Element	false	No authorization	User C	2
Element 1	false	No authorization	User A	1
Element 1	false	No authorization	User C	2
Element 1	false	Non-encrypted dat	User B	1
Element 1	true	No authorization	User B	3
Element 1	true	Non-encrypted dat	User B	1
Element 1	true	Non-normal Time	User B	1
Element 2	true	No authorization	User A	4
Table 1	false	No authorization	User A	9
Table 1	false	Non-encrypted dat	User A	18
Table 1	false	Non-normal Time	User A	40
Table 1	true	Non-normal Time	User B	1
Table 2	false	Non-encrypted dat	User B	7
Table 2	false	Non-normal Time	User B	14

Figure 13 - Relationships between Component Accessed, Violation Type, and Requestor

There was a total of 104 alarms, 10 of which, 9.62%, were labeled as true positive. User B, which is in the role of the Business User, generated the most number of true positive alarms. User A, the Analyst role, generated 1 for No Authorization. There is the question of whether or not ID3 decision tree model is taking the **time** attribute into account regarding true and false positives and if this aids in generating such alarms. While false positives are viewed before and after 7PM, all of the true positives have occurred after such time. For test 2, the model was given a second validation set. This dataset was different than the training data set given in the last test. One re-used the original training set as the basis for training the ID3 algorithm then provided the second validation set. After re-validating the model, one discovered unexpected results. The model was very inaccurate and ended up returning only 43% accuracy with a total of 43 false alarms and 77

true alarms. In order to get more accurate results, one looked into the parameters section of the ID3 algorithm. The two main parameters changed are the **criterion and the minimal gain**, as shown below.



Figure 14 - ID3 default parameters in Rapidminer

Since the ID3 algorithm is based on a predictive decision tree model, Rapidminer or any other similar machine learning tool will show how it makes its decisions based on the training dataset. Rapidminer first makes its decision based on which component is accessed then goes down the tree into the other columns.

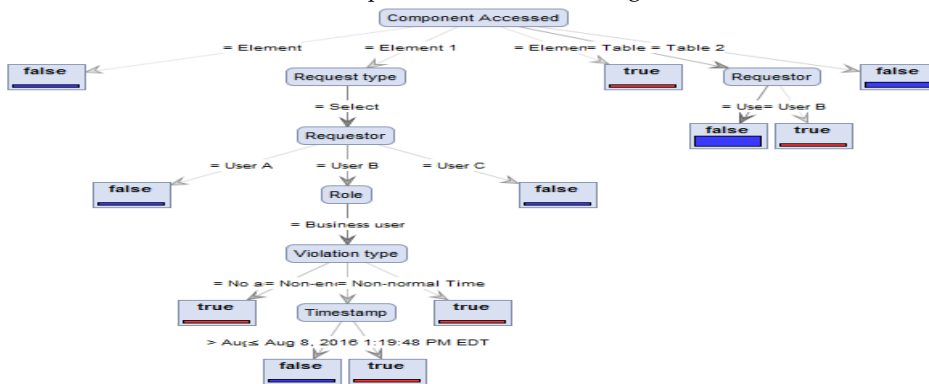


Figure 15 - Rapidminer decision tree on test 2

While the model's new results were much more accurate based on the new parameters, they were not 100% accurate. Since one had increased the gain ratio to its maximum setting, the next steps were to adjust the model's other parameters in order to get a more accurate result. One changed the configuration of the model to force it to select different columns, i.e., look at the **requestor** predictor first instead of the **component accessed**. Based on this gradual adjusting approach, one is able to find a more accurate solution in the model. The next validation test aimed to increase accuracy and introduced the filtering of some input variables. After several gradual adjustments, it was discovered that the model improved its predictions by using the attribute selection of **Alarm, Component Accessed and Role**, with adjusted learning criteria of **gain\_ratio, minimal size for a split of 2, minimal leaf size of 2** instead of 4, and **minimal gain** increased gradually from 0.10 to 0.90.



Figure 16 - Adjusted criteria for the third validation of the ID3 model.

These adjustments produced a new trained tree structure with the **Role** variable as the root node instead of **Component Used**.



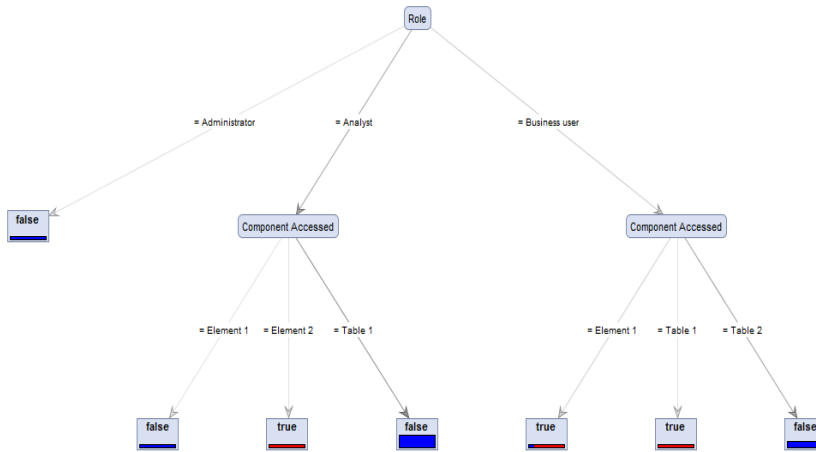


Figure 17 - Diagram from the adjusted criteria for the third validation of the ID3 model

This new decision tree predicted correctly 99% of the new instances, with 13 out of 14 TRUE positives. The incorrectly classified alarm is a new pattern that has a combination of attribute values that the model had not seen before. It assigned it a FALSE alarm score, with a value of “?/?” in the confidence level column.

Row No.	Alarm	prediction(A)	confidence(L)	confidence(R)	Timestamp	Requestor	Role	Component	Request type	Violation type
1	?	false	1	0	Aug 10, 2011	User B	Business us	Table 2	Select	Non-normal
2	?	false	1	0	Aug 10, 2011	User B	Business us	Table 2	Select	Non-normal
3	?	false	1	0	Aug 10, 2011	User B	Business us	Table 2	Select	Non-normal
4	?	false	1	0	Aug 10, 2011	User C	Administrato	Element 1	Select	No authoriza
5	?	true	0	1	Aug 10, 2011	User A	Analyst	Element 2	Select	No authoriza
6	?	true	0	1	Aug 10, 2011	User A	Analyst	Element 2	Select	No authoriza
7	?	true	0	1	Aug 10, 2011	User A	Analyst	Element 2	Select	No authoriza
8	?	false	?	?	Aug 10, 2011	User A	Analyst	Element 3	Append	No authoriza
9	?	false	1	0	Aug 10, 2011	User A	Analyst	Element 1	Select	No authoriza
10	?	false	1	0	Aug 10, 2011	User B	Business us	Table 2	Select	Non-normal
11	?	false	1	0	Aug 10, 2011	User B	Business us	Table 2	Select	Non-normal
12	?	false	1	0	Aug 10, 2011	User B	Business us	Table 2	Select	Non-normal
13	?	false	1	0	Aug 10, 2011	User C	Administrato	Element 1	Select	No authoriza
14	?	false	1	0	Aug 10, 2011	User C	Administrato	Element 1	Select	No authoriza
15	?	false	1	0	Aug 10, 2011	User A	Analyst	Table 1	Select	No authoriza

Figure 18 - The Scored output of the model after criteria adjustments

These “?/?” confidence-level required manual verification by the analyst. Upon the analyst’s confirmation of the true nature of this record, the new instance was included in the training data set for improved knowledge of the model. The validation process was unsuccessful in achieving 100% accuracy to determine true and false alarms based on the sample data sets. However, it was able to produce, a way where security analysts can analyze confirmed and ordered alarms in a more efficient manner, i.e., confirmed true alarms could be analyzed first.

**VI – Contributions**

The primary contribution of this approach is to reduce the amount of time it takes to determine the appropriate action on anomalous events; to confirm the true nature of an alarm, and therefore reduce the risk of missing a malicious instance. The risk of allowing a true breach to go unnoticed will be greatly reduced because the analysts would have the time to concentrate on alarms that have been confirmed as truly dangerous. It is based on the continuing capture of the subject matter experts’ specific knowledge - which is being iteratively “learned” by the algorithm via a mechanism that would permit adjustments to the key predictor variables of the model. Alongside this main contribution, this study also introduces **component I**, a programmatic solution that notifies the DLD engine that discrepancies have been found between its rules and the confirmation results. This secondary contribution uses a formula that compares the state of all the key predictor values and target variables in training set against the access rules set. The contribution of **component I**, the automated fine-tuning feedback to the access rules engine, relies on the iterative process of machine learning of **component F** – the ID3 algorithm – that could automatically assist the DLD engines to be fine-tuned as new access violation patterns are discovered, vetted by the security analysts, and incorporated into the training set. It is possible that some administrators may not accept the automatic

adjustment of the access rules as generated by the **component I** results. Keeping less specific rules is considered to be a “safer” approach to reduce false negatives.

## VII –Future Work

The emphasis of this study has been to address the confirmation of anomalous data access behavior that can be indicative of internal malicious actions, via internal data-at-rest querying; to reduce the risk of the internal attack ineffective examination process while aiming to preserve the confirmation knowledge in a learning model. This enrichment in machine learning hinges on the updating process of the training data set every time the security analyst confirms a **new** questionable instance reported by **component G**. The prototype makes the manual inspection process more efficient and effective, especially in environments that have large data manipulation, by shifting the focus of confirming a true alarm *a posteriori*, and then capturing the vetted analysis result in an updatable data training set. As shown in figure 4, no matter how accurate the algorithm of the detection engine is, there will always be false positives - as the volume of monitored transactions reaches very large proportions, so will the number of alarms that will need manual inspection. The effort in this area of research should be continued by other researchers with the goals of a) increasing the level of automation of the confirmation process, b) expanding it to an agnostic level, c) applying it to other areas where large volumes of false positives hinder research results especially in Big Data query monitoring. Most alarm log files contain key non-numeric predictor attributes, and this characteristic lends itself to the use of machine learning classifiers, such as the ID3 that are suited for data mining of polynomial data sets. With the iterative enrichment of the model via the recurring confirmed training data set, one can eventually capture the subject matter expertise for the handling of true alarms. Future work can use the prototype as a building block to create practical deployments. These deployments can eventually be incorporated into existing or new DLD engines.

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## **A Customer Development Model Approach to the Gig Economy and Freelance Workforce**

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### **Abstract**

The US workforce is moving toward a new trend in contemporary employment designations, which challenge the long-term paradigm of the 'full-time employee' categorization. The way people work is changing. Whether people are working more, working less, all signs point to a boom in freelancer jobs by the year 2020, with estimates of about 40% of the American workforce being considered freelancers. Almost half of the private workforce in the U.S. is run by small businesses. In 2014, small businesses in America employed 57.9 million people or 47.8% of the private workforce. This paper will identify and explore what the needs of this new workforce will be, and how these needs can be supported. Through the lens of the Customer Development Model developed by Steven Blank, this paper posits that freelance workers will be willing to pay a nominal subscription fee for support in the way of a website with a community forum and access to resources and information to help them be more successful as freelancers. A Likert scale instrument was employed to examine 135 respondents through the Customer Discovery Process. Implications are discussed.

The themes in this paper will explore what the needs of freelancers are, and how to help them be more successful, through the lens of the Customer Development Model and an anonymous survey.

We are moving toward a new trend when it comes to the way we work. This paper looks at what the needs and wants of this new workforce will be and how these needs can be supported. The survey technique was used to anonymously survey 135 people through LinkedIn and Facebook. The responses gathered in the survey were put through Dr. Steve Blank's Customer Development Model to assess how to best serve freelancers in this changing economy. The hypothesis of this research is that freelance workers will be willing to pay a small subscription fee for support in the form of a website: SmartWand, that offers a community forum and access to resources and information to help them be more successful as freelancers.

### **Introduction**

In Steve Blank's book, 'The Four Steps to the Epiphany, Successful Strategies for Products that Win', Blank discusses disconnects that some entrepreneurs face when bringing an idea to life. Blank identifies that one of the first issues entrepreneurs face, is the focus on the Product Development Model. Blank explains that the Product Development Model is a traditional model that many startups and entrepreneurs use as the foundation for their ventures. Blank breaks the Product Development Model up into four stages: (1) Concept and Seed Stage (2) Product Development (3) Alpha/Beta Test and (4) Product Launch and First Customer Ship (Blank, 12). Blank's biggest critique of this model is that it is a waterfall model that causes blockers for all of the other departments, and it hinges on the product launch.

By the time of first customer ship, if the company does not understand its market and customers, the consequences unfold in a startup ritual, almost like a Japanese Noh Play. What happens when you fully staff

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sales and marketing and you haven't nailed who your customers are and why they should buy your product? Sales starts missing its numbers. The board gets concerned. The VP of Sales comes to a board meeting, still optimistic, and provides a set of reasonable explanations. The board raises a collective eyebrow. The VP goes back to the field and exhorts the troops to work harder.

Meanwhile, the salespeople start inventing and testing their own alternatives - different departments to call on, different versions of the presentations. Instead of following a methodology of learning and discovering, the sales team has turned into a disorganized and disgruntled mob burning lots of cash. Back in the home office, the product presentation slides are changing weekly (sometimes daily) as Marketing tries to "make up a better story" and send out the latest pitch to a confused sales organization. Morale in the field and in Marketing starts to plummet. Salespeople begin to believe, "This product cannot be sold; no one wants to buy it." (Blank, 14 - 15).

Anecdotally, there is a stereotype about what you are "supposed to do" when working in startup companies. This is seen in television shows like 'Silicon Valley' or Daniel Lyons' book, *Disrupted: My Misadventure in the Start-Up Bubble*. These stereotypes may play into some of the reasons many startups fail. Why does this matter? Because the misadventures of the startup world is the basis for why the Customer Development Model exists. Blank suggests we use a model that focuses on the customer first, rather than focusing on the customer last; which is where the Customer Development Model comes into play. "The Customer Development model of a startup starts with a simple premise: Learning and discovering who a company's initial customers will be, and what markets they are in, requires a separate and distinct process from Product Development (Blank, 21).

### **What makes up the Customer Development Model?**

Similar to the Product Development Model, the Customer Development Model has four stages. These stages are: (1) Customer Discovery (2) Customer Validation (3) Customer Creation and (4) Company Building (Blank, 25). It is important to recognize that the Customer Development Model is not a replacement for the Product Development Model, but a complementary addition to it (Blank, 25).

The goal of the Customer Development Model is to explore whether or not a company's business model is the right fit for the company. When exploring Stage 1: Customer Discovery, we need to see if the product solves customer problems and needs, what is the product/market fit? Stage 2: Customer Validation focuses on the creation and scalability of the sales model. Stage 3: Customer Creation is about creating and driving end-user demand. Stage 4: Company Building pulls everything together bringing a sense of "brand" and "culture" to the company, not based on what they think they should be, but what they are (Blank, 26).

The Customer Development Model strives to make sure that Company Building is being evaluated *at the right time*. For example, having open workspaces and a trendy logo might not matter if a startup is serving the financial services industry. On the other hand, open workspaces and trendy logos might matter if a startup is serving the cosmetics industry, or the toy industry. Companies should figure out who they are *after* they have established their customers, not beforehand.

Customer Discovery does not have anything to do with feature hunting, "An important insight is that the goal of Customer Development is not to collect feature lists from prospective customers, nor is it to run lots of focus groups. In a startup, the founders and Product Development team define the first product. The job of the Customer Development team is to see whether there are customers and a market for that vision," (Blank, 28).

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Blank is very careful to make sure that he is clear that there is a distinction between Product Development and Customer Development. Customer Discovery, Stage 1 of the Customer Development Model, is about continually reiterating and asking who your customers are and what they want from you.

The second stage of the Customer Development Model is Customer Validation. Stage 2 focuses on the importance of sustainability, and building a repeatable sales roadmap for sales and marketing. Customer Discovery and Customer Validation corroborate your business model (Blank, 29).

### **The way we work is changing**

Freelancing comes in many different forms. In 2010, financial software company, Intuit released the *Intuit 2020 Report, Twenty Trends that Will Shape the Next Decade*. Intuit develops and sells financial, accounting, and tax preparation software and services for small businesses and individuals. Their flagship products include TurboTax, QuickBooks, and Mint. In the Intuit 2020 Report, noteworthy predictions were made, pointing to major shifts in the workforce by 2020.

Eight years later, some of the predictions from Intuit's 2020 Report have started to unfold. In 2010, Intuit predicted that women would be a dominant force in the global market. Based on research by DeAnne Augirre and Karim Sabbagh of Booz & Company, by 2020 there will be approximately 870 million women world-wide, also known as "The Third Billion" that will enter the economic mainstream, gain employment, or start their own business.

The Intuit 2020 Report made another prediction that is developing: Traditional employment will no longer be the norm. In her article, 'The Next Generation Workforce: Full-Time and Contract Employees' Sarah Alexander notes that the freelancer website, Upwork.com posts about three million jobs per year, and is a facilitator of more than \$1 billion in freelancer earnings per year. Upwork.com is just one of many freelance websites used today. Freelancer.com, Fiverr.com, Elance.com Guru.com and Taskrabbit.com are just a handful of websites where users can offer freelance services and find freelance work

### **Customer Discovery**

Customer Discovery is the first stage of the Customer Development Model and it helps define the problem, product and the customer hypotheses in the business plan and if those hypotheses are correct (Blank, 27). In this stage, Blank suggests that the goal is to develop for the few, not the many (Blank, 44). It seems that Blank suggests to develop for a "niche" because this is a startup there is not an existing market or an existing customer and that's the whole point of Customer Discovery, to learn who the customer is without making assumptions. In this stage, Blank says we'll find "earlyvangelists" which are similar to brand champions or evangelist customers. Earlyvangelists are visionary customers who can see the potential (Blank, 45). In a way, earlyvangelists are similar to investors, they can see the potential and are interested in being part of the building process in one way or another. In the case of the earlyvangelist, they are part of the building process and the iterations by giving feedback, insights. Blank refers to the Customer Discovery Process as "Phase 0", before getting started buy-in is needed from the board and executive staff (Blank, 49).

The Customer Discovery Process is made up of four phases: (1) State the Hypotheses (2) Test & Qualify the Hypothesis (3) Test Features of the Product Concept, and (4) Verify Customer Problems.

### **What's the problem facing freelancers today?**

What do seasoned and new freelancers need to be successful? With an increasing percentage of the U.S. workforce becoming freelancers, they'll need a different set of tools to navigate this new economy. To find out what the problem facing freelancers is, the concept of the SmartWand website and the responses of the anonymous survey (discussed in the Abstract) will be put through the lens of the Customer Development Model.

To test the problem-solution, the anonymous Likert scale survey used in this research was distributed through Facebook and LinkedIn. Gig Economy and Side hustle were both defined in the introduction of the survey. The Gig Economy, defined as a labor market characterized by the prevalence of short-term contracts or freelance work as opposed to permanent jobs. A Side Hustle, defined as a gig that allows you to make money in addition to your primary job. Below are the most impactful responses from the survey.

**Figure 1: What is your age?**

18 - 25 Years Old - 11 Respondents (8.1%)
26 - 35 Years Old - 80 Respondents (58.8%)
36 - 45 Years Old - 34 Respondents (25.0%)
46 - 50 Years Old - 5 Respondents (3.7%)
50 and Over - 6 Respondents (4.4%)

**Figure 2: What gender do you identify as?**

Agender - 1 Respondent (0.7%)
Female - 132 Respondents (97.1%)
Male - 3 Respondents (2.2%)

Survey respondents’ answers were kept anonymous from both Facebook and LinkedIn. There were 80 (58.8%) respondents who were 26 - 35 years old. There were 132 (97.1%) respondents who identified as female, given that the survey was distributed through the researcher’s own personal social media networks, the researcher had expected the data show this, because respondents who identify as female would be the largest demographic they were able to reach.

The research by DeAnne Augirre and Karim Sabbagh of Booz & Company on “The Third Billion” (mentioned earlier) and the gender demographics the researcher was able to gather information from shifted the focus of research from the Gig Economy as a whole, to focus specifically on women in the Gig Economy. Learning about men in the Gig Economy would be the next logical step in rounding out the customer validation process. If there was more data from respondents who identified as men, the data would be more comprehensive. However, the researcher did not have access to a significant number of male survey respondents, and shifted the initial focus of the research.

**Figure 3: Ethnicity origin (or Race): Please specify your ethnicity:**

Black or African American - 2 Respondents (1.5%)
Caucasian or White - 127 Respondents (93.4%)
Hispanic or Latino - 6 Respondents (4.4%)
Mixed - 1 Respondent (0.7%)

**Figure 4: What is the highest degree level of school you have completed?  
If currently enrolled, highest degree received.**

Associate Degree - 22 Respondents (16.2%)
Bachelor’s Degree - 37 Respondents (27.2%)
Doctorate Degree - 3 Respondents (2.2%)
High school graduate, diploma or the equivalent (for example: GED) - 7 Respondents (5.1%)
Master’s Degree - 22 Respondents (16.2%)
Professional Degree- 3 Respondents (2.2%)
Some college credit, no degree - 33 Respondents (24.3%)
Trade/technical/vocational training - 9 Respondents (6.6%)

There were 127 (93.4%) respondents who identified as Caucasian or White. There were 37 (27.2%) respondents who reported having a Bachelor’s Degree, with 33 (24.3%) respondents answering that they completed some college without a degree. There was a tie of 22 (16.2%) respondents who received their Master’s and Associate’s Degrees.

**Figure 5: What is your marital status?**

Divorced - 7 Respondents (5.1%)
Divorced, cohabitating - 1 Respondent (0.7%)
Married or domestic partnership - 102 Respondents (75.0%)
Separated - 4 Respondents (2.1%)
Single, never married - 22 Respondents (16.2%)

**Figure 6: What is your total household income?**

Less than \$25,000 - 9 Respondents (6.6%)
\$25,000 - \$34,999 - 17 Respondents (12.5%)

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\$35,000 - \$49,999 - 24 Respondents (17.6%)
\$50,000 - \$74,999 - 32 Respondents (23.5%)
\$75,000 - \$99,999 - 27 Respondents (19.9%)
\$100,000 - \$149,999 - 15 Respondents (11.0%)
\$150,000 - \$199,999 - 7 Respondents (5.1%)
\$200,000 or more - 4 Respondents (2.9%)
No (Free form response) - 1 Respondent (0.7%)

There were 102 (75.0%) of the respondents who reported being married or in a domestic partnership. The highest reported range of total household income was \$50,000 to \$74,999 from 32 (23.5%) respondents. The second highest reported range of total household income was \$75,000 to \$99,999 from 27 (19.9%) respondents. There were 85 (62.5%) respondents who reported being employed for wages. There were 93 (68.4%) of respondents who reported that they did not participate in the gig economy, with 42 (30.9%) of respondents answering yes, and 1 (0.7%) respondent answering that they sometimes participate in the gig economy.

**Figure 7: What is your current employment status?**

A homemaker - 15 Respondents (11.0%)
A student - 3 Respondents (2.2%)
Employed and a student - 1 Respondent (0.7%)
Employed for wages - 85 Respondents (62.5%)
I'm a doula but I also work as a substitute aide for a preschool (Free form response) - 1 Respondent (0.7%)
LLR Retailer and stay at home mom (Free form response) - 1 Respondent (0.7%)
Out of work and looking for work - 2 Respondents (1.5%)
Self-employed - 24 Respondents (17.6%)
Unable to work - 4 Respondents (2.9%)

**Figure 8: Do you participate in the Gig Economy? The Gig Economy is a labor market characterized by the prevalence of short-term contracts or freelance work.**

No - 93 Respondents (68.9%)
Sometimes - 1 Respondent (0.7%)
Yes - 42 Respondents (30.9%)

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The next question asked in the survey was 'If so, can you tell me more about how you participate in the Gig Economy?' There were 42 individual responses. Examples of responses included babysitting, direct sales, and selling crafts and homemade goods. There were distinct responses, with the majority of responses showing that respondents associated a side hustle with direct sales/multi-level-marketing (MLM) companies.

### Figure 9: Do you have a Side Hustle?

**A Side Hustle is a gig that allows you to make money in addition to your primary job.**

No - 34 Respondents (25.0%)
Yes - 102 Respondents (75.0%)

Similar to the question in Figure 2, the responses in Figure 9, above were based on sample the researcher was able to gather. Given where the anonymous survey was distributed: Facebook and LinkedIn, and the nature of the survey description, the respondents who answered the survey have interest in freelancing, side hustles and the gig economy. Even though the data is skewed, the questions are getting to the right demographic, and the data still serves as a good basis for further research.

The next question asked in the survey was 'If so, can you tell me more about your Side Hustle?' There were 98 responses in total. These responses were similar to 42 responses given when asked how the respondents participate in the Gig Economy.

Respondents were asked about how they participated in the gig economy, and a smattering of answers were received. Answers ranged from hiring artists to selling leggings on Facebook. Respondents were also asked if they had a side hustle, with 102 (75.0%) of respondents answering yes, and 34 (25.0%) of respondents answering no. Even though the survey defined the gig economy and side hustles independently, the phrases were still being used interchangeably in the respondent's answers.

### Figure 10: If you had access to the right resources, people, or a website/app to support your success in the Gig Economy or freelancing, would you be interested in freelance work or being part of the Gig Economy?

I was told it would be extremely supportive. However, there are more competitive and unsupportive than there are. Many women bash and bring it hers down unfortunately. (Free Form Response) - 1 Respondent (0.7%)
Maybe - 59 Respondents (43.4%)
No - 20 Respondents (14.7%)
Would like more info to answer (Free Form Response) - 1 Respondent (0.7%)
Yes - 55 Respondents (40.4%)

### Figure 11: If the Gig Economy or Side Hustle resources were offered online via a monthly subscription model, do you agree that you would pay for a subscription?



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Agree - 14 Respondents (10.3%)
Disagree - 37 Respondents (27.2%)
I did unfortunately (Free Form Response) - 1 Respondent (0.7%)
Strongly Agree - 7 Respondents (5.1%)
Strongly Disagree - 18 Respondents (13.2%)
Undecided - 59 Respondents (43.4%)

One respondent typed in their own answer in the free form response text box rather than choosing one of the standard choices. It would be good to know more about this respondent's answer, since it doesn't seem to answer the question correctly.

The last two questions in the survey really focused on Customer Validation, in the question noted in Figure 10, 'If you had access to the right resources, people, or website/app to support your success in the Gig Economy OR would you be interested in being part of the Gig Economy?' 59 (43.3%) respondents answered 'Maybe'. 'Maybe' was one of the standard answer choices offered, and the majority of people who answered this question, chose 'Maybe'. 'Yes' was the second most popular response, with 55 (40.4%) of respondents expressing that they would be interested in access to the right resources. Based on the responses to this question alone, it seems like the idea that having access to the right resources was appealing, or at least intriguing to the respondents.

The next question was, "If Gig Economy or Side Hustle resources were offered online via a monthly subscription model, do you agree that you would pay for a subscription?" The majority of respondents did not respond with a resounding "no" right off the bat, there were 59 (43.4%) of respondents who responded that they were undecided which was followed by 37 (27.2%) respondents who disagreed with the statement. Another factor as to why respondents disagreed with this statement, there could be a misconception about why this question was being asked in the first place. Respondents might have thought that the goal of the survey was to obtain their information to try and sell them something. Even without asking respondents to purchase anything, asking a question about making a purchase could have impacted respondent's answers. Rewording this question, or would be a way to gauge if respondents answers were impacted by the thought they may be targeted as a sales prospect following the survey. However, the majority respondents were still curious and open to idea of paying for a subscription based on their responses from the question shown in Figure 10.

The last question of the survey was asked to gauge how to develop offerings for the few and not the many, like Blank suggests. In the question "What comes to mind when you hear the phrases "Gig Economy" or "Side Hustle"? Most responses did not have a positive view of the gig economy or side hustles, a few colorful examples were "side hustle = MLM where most people get screwed but the people at the top get rich", or "Prostitution". There were responses that were in line with the definitions of gig economy and side hustle outlined in the beginning of the survey, such as "A way to help your family", and "Motivated". This finding would suggest with any further research it would be best to stay away from the phrases 'side hustle' and 'gig economy'. Even after defining these phrases in the beginning of the survey, it seems as though these terms were not clear enough. Choosing better phrases is an easy fix to identify the customer, and is a problem that can solved for in further research. With the confusion around phrases, the survey responses still show there is a need for freelancers to use the proposed SmartWand website.

After putting the initial hypothesis of the research through the Customer Discovery Phases, and evaluating the survey responses, there are a few iterations that the researcher needs to make, however, there seems to be enough interest in paying a subscription fee for a website that supports freelancer success.

### **Customer Validation**

After working through the Customer Discovery Model, the next stage is Customer Validation. Just like Customer Discovery, this stage is disorienting to traditional sales and marketing teams, "In the Customer Validation stage, you are not going to staff a sales team. You are not going to execute a sales plan, and you are definitely not going to execute your "sales strategy". You simply do not know enough to do any of these things," (Blank, 109).

The goal of Customer Validation is to end this stage with a proven and tested sales roadmap. The "earlyvangelists" mentioned earlier will come into play, this is when testing the idea of the scalability and sustainability of your sales process happens.

Blank warns that it might be instinctual to use the Customer Validation stage as a reason to add more salespeople to the team, yet this instinct should be resisted, "a CEO's first instinct is to speed up the process by putting more salespeople on the field. This only slows the process," (Blank, 110). This theory is shared by Fred Brooks in the form "Brooks's Law" which states, "Adding manpower to a late software project makes it later." Adding a requirement to onboard new teammates and introducing more layers of communication leads to more complexity. Even though Brooks's Law refers to software development and project management, the core of the message still holds true for the Customer Validation Stage.

Adding more people to the team, in hopes of trying to speed up the process is not a good idea because this is where the process and the sales roadmap is being created. Adding more people will only add more chaos. Blank outlines the basic questions that need to be answered in order to create a sales roadmap: "Are we sure we have a product/market fit? Who influences a sale? Who recommends a sale? Who is the decision-maker? Who is the economic buyer? Who is the saboteur? Where is the budget for purchasing the type of product you're selling? How many sales calls are needed per sale? Is this a solution sale? If so what are "key customer problems"? What is the profile of the optimal visionary buyer, the earlyvangelist every startup needs?," (Blank, 111).

Until a company has proven answers to the above questions, "few sales will happen," (Blank, 111) this is because the Customer Validation stage is not about selling. If companies apply the Product Development Model during this stage they can't validate their success of the sales roadmap. The Customer Validation Stage has four phases: (1) Getting Ready to Sell: Articulating the Value Proposition (2) Get Out of the Building: Attempting to sell customers an unfinished and unproven product without a professional sales organization (3) Initial Positioning: Articulate your belief about your product and its place in the market, and (4) Verify Customer Validation (Blank, 113 -114).

The Customer Validation Process begins with getting ready to sell, this is where the value proposition is articulated. During the course of this research, SmartWand came to be. The value proposition is a single, clear compelling message that says why your company is different and your product is worth buying (Blank, 115).

SmartWand's value proposition is as follows: "SmartWand is a community that fosters small business success through networking and education. The way we work is constantly evolving, and so are we."

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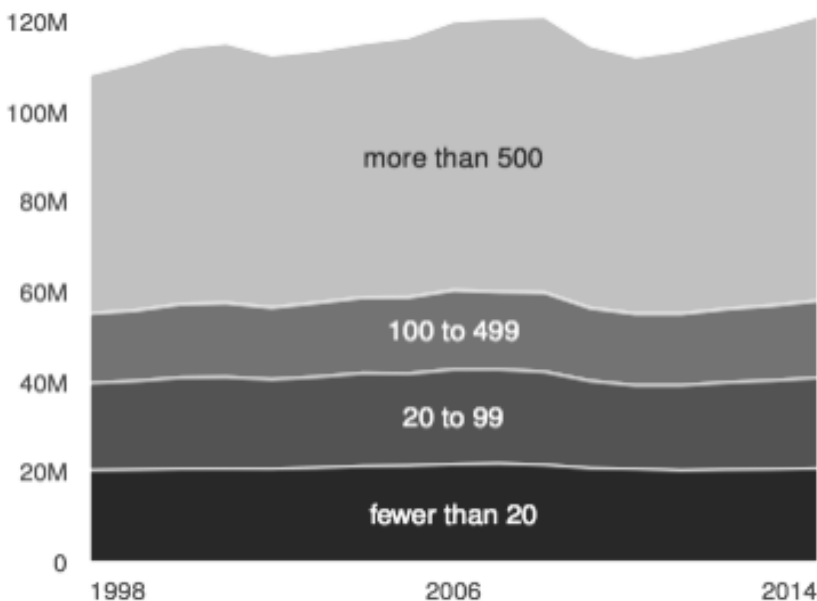
The value proposition is based on some of the foundational elements that Blank suggests should be part of a value proposition: “Is the value proposition understandable in the users’ language?”, “Second, does your value proposition make or enforce an economic case? Does it have an economic impact?” (Blank, 115 -116).

During the course of this research, the researcher came across ByDesign Technologies. Paparazzi Jewelry and Accessories is a client of ByDesign, for a nominal fee of \$4.95/month, Paparazzi’s Independent Consultants are able to access “Pro” features of their back office software. These “Pro” features include more communication tools, prospecting tools, business building tools, and reporting. ByDesign.com offers software solutions for direct sales and MLM companies through their Freedom Platform. ByDesign has been around since 2000 and was first-to-market in 2008 with a mobile application for the direct sales industry. According to their website, they have nearly 1000 clients (ByDesign, 2018).

Some of the offerings and functionality of ByDesign’s software would be beneficial to the target audience of SmartWand. There is an overlap in ByDesign’s client offerings and the needs of SmartWand’s target audience, even though SmartWand would not be focused on catering their offerings to direct sales business models like ByDesign. With nearly 1000 clients, ByDesign helps validate SmartWand’s target audience: freelancers and small businesses.

Figure 12 shows that in 2014, almost half of the private workforce is run by small businesses. Small businesses across the United States employed 57.9 million people, or 47.8% of the private workforce (Statistics of the U.S. Businesses, U.S. Census Bureau, 2017).

**Figure 12: United States Employment by Business Size (Employees)**

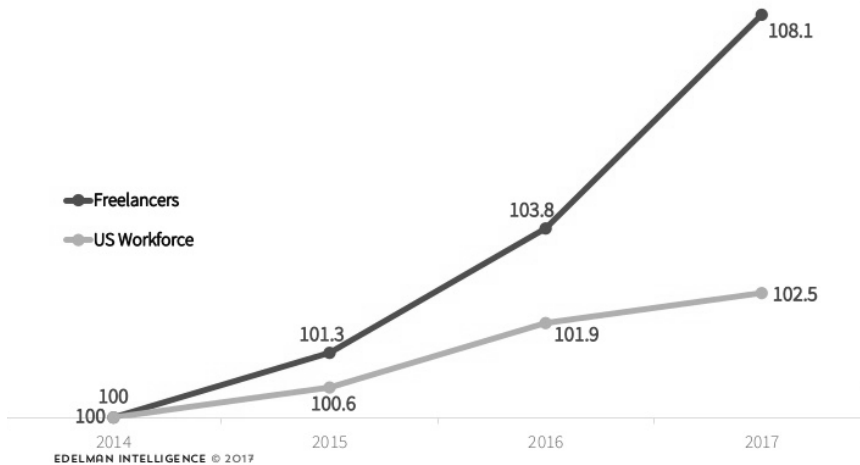


Source: [https://www.sba.gov/sites/default/files/advocacy/United\\_States\\_1.pdf](https://www.sba.gov/sites/default/files/advocacy/United_States_1.pdf)

**Figure 13: The Growth of the Freelance Workforce is Accelerating, More than Tripling the Growth of the Overall Workforce**

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Growth rate of US Workforce vs. Freelance Workforce Over Time  
[Indexed to 2014]



**Information about Indexing**  
**What we did:** 2014 data on the size of the freelancer and US workforces has been established as the benchmark (noted on the graph as 100). Each subsequent number indicates the % growth in the respective workforce groups relative to their 2014 levels (i.e. relative to 2014, the 2017 freelance workforce has grown 8.1%).  
**Why?** These indexed values allow for a cleaner apples-to-apples visualization of the rate of growth for each group relative to their respective group sizes.

Source: <https://www.slideshare.net/upwork/freelancing-in-america-2017/1> (Slide 17)

In the report, “Freelancing in America: 2017”, put out by the Freelancers Union, 57.3 million people freelanced in 2017, with 47% of millennials freelancing during 2017.

The authors of this paper developed the SmartWand and an entrepreneurial business concept as a means of testing Blank’s model.

SmartWand’s target customers are freelancers and those who own or who are employed by small businesses. The target customers: freelancers and small businesses, overlap in their needs which are different from the needs larger corporations. Knowing who the target customers are, validates that SmartWand has a potential customer.

## Customer Creation

Moving on to the next stage of the Customer Development Model is Customer Creation. The first step in Customer Creation is recognizing which one of the four types of startups your startup is: (1) Startups that are entering an existing market (2) Startups that are creating an entirely new market (3) Startups that want to resegment and existing market as a low-cost entrant, and (4) Startups that want to resegment an existing market as a niche player (Blank, 31). “Before sales or marketing activities can begin, a company must keep testing and asking, ‘What kind of startup are we?’ ”, (Blank, 33).

At first, the research seemed to suggest that SmartWand would be considered a new product in an existing market. However, based on Blank’s definitions, SmartWand would be better categorized as a new product attempting to re-segment in an existing market, or a niche re-segmentation. With the existence of freelance websites, websites supporting small business operations like Intuit, or SaaS platforms similar to ByDesign, there are products that exist for the customer and the target audience that SmartWand is posed to reach.

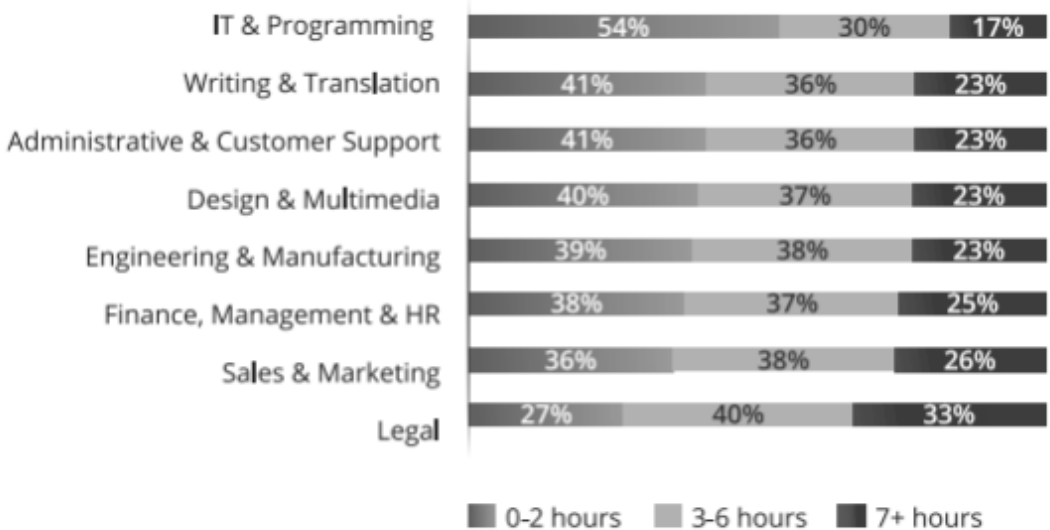
According to Blank, “Niche re-segmentation attempts to convince customers some characteristic of the new product is radical enough to change the rules and shape of an existing market,” (Blank, 34). Based on Blank’s definition niche re-segmentation would better define SmartWand because various existing freelancing websites would be considered competitors. Freelance websites would be my main competitors. Websites such as Poshmark.com, Etsy.com, Facebook.com and the Instagram mobile app as secondary competitors

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since there is a community aspect around selling and services through those websites. According to Upwork's "Freelancing in America: 2017" Report, freelancers are finding more work online. 71% of respondents stated that the amount of work obtained online has increased from 2016.

Even though freelance websites would be SmartWand's main competition, it is important to note that freelance websites do not have it "all figured out". The 2018 Payoneer Freelancer Income Survey surveyed 21,000 freelancers from 170 countries and found 47% of freelancers surveyed report that they spend two hours or less a week looking for new projects. This is dependent on what type of industry a freelancer is working in. With more freelancers finding work online, freelancers are still spending up to two hours a week looking for new projects.

**Figure 14: How Much Time Do Freelancers Spend on Finding New Jobs?**



Source: <https://www.payoneer.com/downloads/freelancer-income-report-2018.pdf>

The survey also gave interesting insight into what freelancers would like to improve on. 68% of the respondents in the Payoneer survey wanted to make more money and 52% of respondents surveyed want to improve the methods for finding clients and work. What does this mean? It means that there is room for improvement in meeting the needs of freelancers.

**Figure 15: What Would Freelancers Like to Improve?**



Source: <https://www.payoneer.com/downloads/freelancer-income-report-2018.pdf>

The questions asked in the Payoneer Report, helped solidify confidence in the hypothesis of SmartWand’s sustainability after being put through the Customer Development Model.

**Company Building**

The last step of the Customer Development Model is Company Building. There are four phases of Company Building: (1) Reaching Mainstream Customers (2) Reviewing Management and Creating a Mission-centric Culture (3) Capitalizing on the learning and discovery that has been done so far and create functional departments (4) Build Fast-response departments (Blank, 220).

Executives and the board need to recognize that there is still uncertainty that they’ll face when reaching for mainstream customers (Blank, 215). Blank offers the idea that startups should move its company organization through three distinct stages: (1) Customer Development (2) Company Building and (3) Large Company (Blank, 217).

To be successful in all four phases of Company Building, there are goals suggested by Blank. To reach mainstream customers, the company needs to transition from the early sales roadmap into a scalable business. Review management and build a mission-centric organization needs to have the goal of growing past the Customer Development team, the management team needs to be the team that can build the company. The Customer Development team is then broken into functional departments, they have the goal of setting up objectives that match the market type.

The last phase of Company Building is building fast response departments. These fast response departments have the goal of making sure they don’t lose sight of how to iterate and grow (Blank, 263).

**Mission Statement: Where we’re headed next**

At this stage, the mission statement should be crafted, “The litmus test is this: Can new hires read the corporate mission statement and understand the company, their job, and what they need to do to succeed?” (Blank, 238). Elements of a good mission statement include: (1) Why your employees come to work (2) What

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they need to do all day (3) How they will know they have succeeded (4) Corporate revenue and profit goals (Blank, 238).

SmartWand Mission Statement: Our mission at SmartWand is to support the way the economy is changing, growing and learning. The SmartWand website gives users access to tools, education, and ways to find freelance work and find freelancer services. We recognize that the way we work is constantly evolving, and so are we. We are going to be selling a subscription to SmartWand which gives users access to offer their freelance services, find freelance workers, learn from the community and share experiences. SmartWand is the missing link that the freelance economy needs.

### Next Steps

It was helpful to put the idea for SmartWand through Blank's 'Four Steps of Epiphany' to see if the idea was a viable idea worth pursuing and creating a business plan around. In the beginning of the paper, the differences between the Customer Development Model and the Product Development Model, were discussed. After using the Customer Development Model, it all started to become clear how startups have a hard time differentiating between product development and customer development, and how that can lead to the failure of a startup.

The combination of following the principles of the Customer Development Model along with the survey results, were successful enough to validate the hypothesis that freelancers would find value in the SmartWand's offerings.

Nearing the end this research, mobile payment company, Square purchased website builder, Weebly for \$365 Million Dollars (techcrunch.com). This acquisition meant that there is a large focus on small business and what infrastructure needs to be in place to support the growth of small business by 2020.

In Square's acquisition release, Jack Dorsey, CEO of Square focused on the needs of entrepreneurs, saying "Square and Weebly share a passion for empowering and celebrating entrepreneurs." The focus on entrepreneurship and this growing demographic is at the core of this acquisition, "Entrepreneurship gives an opportunity to people who were never given one," said David Rusenko, CEO of Weebly.

The next step in this research is for the author to pursue a working prototype of the SmartWand website. The website's goal is to foster success for freelancers and small business alike, through networking and education. By recognizing, and addressing the needs of a new workforce, and the with the wave of a SmartWand we will be more prepared for the way work is changing.

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“You Get Me”: Capitalizing on Big Data, Behavioral Targeting, and Relationship Building

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**Abstract**

The vast amount of data collected on consumers' everyday enhances the ability of companies to identify target markets, customize offerings, and meet consumer needs. Technological advances aid data collection with increased use of applications and retailer reward programs for example. Data collected throughout the consumer purchase process and repeat purchase processes, can reveal insightful usage rate and temporal consumption patterns to increase relevance and effectiveness of sales promotions. However, even though retailers collect consumer data, many are not capitalizing on the ability to build stronger relationships with their consumers through detailed analysis of the data and delivery of more relevant and timely promotions. As a result some retailers are experiencing significant opportunity loss by not enhancing understanding of consumer behavioral patterns. This paper will explore current practices of retailers in the grocery and pharmaceutical industries who collect massive amounts of data on consumers and the effectiveness of their practices in strengthening consumer relationships.

Key Terms: Behavioral Targeting, Usage Rate segmentation, Perceptual Vigilance, Relationship Marketing