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Special Presentations
Abstracts & Full Papers

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International Multidisciplinary Research Foundation Thailand Chapter
Diplomatic Research & Policy Foundation (DRPF), Macedonia
International Institute of Management (IIM), Australia
Dear Associates

Welcome to each and every one of you congregated for the prestigious IMRF’s 103rd International Gathering - Proceedings of the International Multidisciplinary Research Conference Thailand 2019 hosted at Asian Institute of Technology Conference Center, Bangkok Thailand organized by IMRF Institute for Education & Research - Thailand Chapter which is considered to be one of the premier events for the distinguished academic and research cult with the encouragement of Diplomatic Research & Policy Foundation (DRPF), Macedonia; International Institute of Management (IIM), Australia.

We know that an academic conference is a symposium for inventive academicians and imaginativeresearchers to give academics an opportunity to present their academic works, concepts and newdiscoveriesand to exchange their ideas and develop their works and also to share idea in presenting fordevelopment in the new research and topics and so forth. Together with academic or scientific journals, conferences plausibly provide a central channel for exchange of information among earnest researchers.

IMRF with its Academic Chapters in many Countries, since inception, has a great academic, research and socialpriorities to promote the spirit of values and orientations in multidisciplinary research functions of educationby working out in dexterity required by the integrity of a sophisticated social world order duly transmittingcentral heritage with scientific bent of mind forming socialization process in respect of reformation of attitudesto confer a serene status for a rational being called man on this civilized planet, of course, from the threshold of Ratna Prasad Multidisciplinary Research and Educational Society.

IMRF with its collaborative organizations, has left no stone unturned for the accomplishment of its vision and mission catering its influentialservices in the academic and research disciplines comprising the streams of Human Rights, Social Sciences,Arts and Education, English Studies, Business Sciences, Engineering Sciences, Mathematical Sciences, LifeSciences, organizing International Conferences humbly witnessing the virtuous presence and innovatepresentations of investigating pioneers, potential leaders, promising researchers, intellectual academicians,working faculty, industry magnates, advanced educationists, eminent scientists, rational thinkers, earnestscholars and superior students with their bonafide work of discovery from as many as 50 and more countriesin the world (with their recurring presence) including home towards showcasing their professionalperformance with excellent communication skills based on their accumulated experience in the fieldscconcerned successfully.
Globalization is a fact. Its internalization process integrates multidisciplinary fields to embark on an adventure in the realm of academics and research. As such, this conference by International Multidisciplinary Research Foundation (IMRF). I am pleased to unveil the fact that this Copy of Proceedings marked with ISBN No 978-93-86435-77-4 presents an educative network of research with strength of quality, originality and contribution to knowledge of significant fields of multidisciplinary realms duly identified by the solemn research portals and academic destinations in the world.

While presenting you with this sonata of latest academics and research findings, I humbly place on record my loyal acknowledgement of sincere appreciation, due recognition and heart-felt thanks to all intellectual paper presenters, article contributors, members on the esteemed Editorial Board, centres of higher learning incollaboration with IMRF, foreign-national delegates, erudite plenary speakers, scholarly participants and all those who are directly or indirectly in conformity with this IMRF conferences from home and abroad for their righteous everlasting support in one and all aspects and my sincere thanks to Asian Institute of Technology, Bangkok, Thailand for their ever dynamic support and cooperation. Gratitude is attitude!

With effusive thanks,

Dr. Ratnakar D. Bala
Conference Chairman
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NANO TOPOLOGICAL MODEL ON MEDICAL DIAGNOSIS

DR. M. LELLIS THIVAGAR

Abstract: Topological ideas are present in almost all areas of today's Mathematics. Modern Topology in particular lays the foundations for several areas of research in Topology such as Bitopology, Fuzzy topology, Digital topology and Nano topology. In 1970, Levin introduced generalized closed sets in a topological space in order to extend many of the important properties of closed sets to a larger family. In the recent past, there has been considerable interest in the study of various forms of generalized closed sets. Although it is classified as pure mathematics, when converted into Bitopology, Fuzzy topology, Digital topology and Nano topology, it becomes application oriented around. Nano science is the field that investigates Nano particles often have unexpected visible properties because they are small enough to confine their electrons and produce quantum effects. But certain nano terms are satisfied simply to mean “very small”, nano car is an example. We introduce a new type of topology namely Nano topology which contains at most five open sets. In this paper is an attempt to establish topological structures in terms of base associated with an equivalence relation and to apply the proposed topological structure in the process of knowledge reduction in medical diagnosis resulting in knowledge discovery in a form easily understandable by humans.

References:


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FUZZYBAIRE RESOLVABLE AND
FUZZYBAIRE IRRESOLVABLE SPACES

DR. GANESAN THANGARAJ

Abstract: The notion of fuzzy sets as an approach to a mathematical representation of vagueness in everyday language, was introduced by L.A. Zadeh [9] in his classical paper in the year 1965. In 1968, C.L. Chang [2] introduced the concept of fuzzy topological spaces. The paper of Chang paved the way for the subsequent tremendous growth of the numerous fuzzy topological concepts. In 1899, Rene Louis Baire [1] introduced the concepts of first category and second category sets in his doctoral thesis. E. Hewitt [3] introduced the concepts of resolvability and irresolvability in topological spaces. In the recent years, a considerable amount of research has been done on various types of fuzzy sets in fuzzy topological spaces. The concepts of resolvability, irresolvability in fuzzy setting were introduced and studied by G. Thangaraj and G. Balasubramanian [5]. The purpose of this paper is to study fuzzy Baire dense sets in fuzzy topological spaces and fuzzy Baire resolvable spaces and fuzzy Baire irresolvable spaces. Several characterizations of fuzzy Baire resolvable spaces, are established. The conditions for fuzzy topological spaces to become fuzzy Baire resolvable spaces, fuzzy resolvable spaces, are obtained by means of fuzzy Baire dense sets.

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1. R.L.Baire, Sur les functions de variables reelles, Annali de Matematics, Serie 3. 3 (1899), 1 – 123.

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PROBABILITY DISTRIBUTIONS AND ITS APPLICATIONS WITH VARIOUS EXPRESSION

DR. TARNI MANDAL

Abstract: Normal distribution is one of the most widely used continuous probability distribution in application of statistical method. In this paper, we introduce the normal distribution is of tremendous importance in the analysis and evaluations of every aspect of experimental data in science and medicines. We derive an expression for the $r^{th}$ moment, the $r^{th}$ central moment various, skewness, kurtosis mode, pointed in flexion, distributed function, probability density function, mean deviation, about the mean, mean deviation about the medium, standard normal distribution, area under normal curve. We also discuss the moment generating function about origin and provide an expression quartile deviation of the normal distributions, fitting of normal distribution, probable error.

Keywords: Normal Distribution, Moments, Moment Generating Function, Mean Deviation, Quartile Deviation, Standard Normal Distributions.

***

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DYNAMICS OF DONORS AND EXCITONS IN LOW DIMENSIONAL SYSTEMS

DR. M. ARULMOZHI

Abstract: Semiconductors are among the most interesting and useful substances of all classes of solids, as they exhibit a wide spectrum of phenomena. Reduction in the dimensionality of a physical system has profound consequences on its profile and new types of electronic and photonic devices can be designed. Due to the vast development in the field of nanotechnology, low dimensional semiconducting systems (quasi-2D systems called quantum wells, quasi-1D systems called quantum wires and quasi-0D systems called quantum dots) achieved immense interest in the past few years. The advanced techniques of nanotechnology have made carrier confinement to be possible in these systems with different shapes. These structures generate unique properties and they show immense potential in the field of optoelectronic device fabrication, such as light emitting and laser diodes with polarized output. Quantum mechanics plays a major role as the semiconductor size approaches the nanoscale. Theoretical and experimental investigations on hydrogenic donor (impurities which donate electron to the conduction band) and exciton (electron-hole pair) in quantum nanostructures made of semiconductors play an important role in understanding the electrical and optical properties of the nanostructures. The present work deals with the dynamics of these quantum carriers in different low dimensional semiconductor systems and the properties associated with them.

Keywords: Donor, Exciton, Semiconductors, Nanotechnology, Quantum Nanostructures.

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MAJOR ACTIVITIES OF THE SUN AND THEIR CONSEQUENCES

DR. A. SHANMUGARAJU

Abstract: The study about the Sun and its various activities (called Solar Astrophysics) and their effects on the Earth are very important in different aspects. Some of the major activities are flares, Coronal Mass Ejections (CMEs), radio bursts and plasma shocks, acceleration of high energy particles, geomagnetic storms and solar-terrestrial relationship. Coronal Mass Ejections (CMEs) are magnetized plasma ejected from the Sun into the interplanetary medium. The mass and velocity of CME are of the order of $10^{15} - 10^{16}$ g and $100 - 2000$ km/s, respectively. The CMEs are found to be responsible for producing interplanetary shocks, communication disturbances and geomagnetic storms. By solving the equation of motion, the velocity of CMEs in the space at various distances can be calculated and hence the time of arrival of CMEs at Earth can be forecasted. The major solar activities, their physical characteristics and their effects will be presented.

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GOAL PROGRAMMING APPROACH FOR
MULTI-OBJECTIVE DECENTRALIZED BI-LEVEL LINEAR
FRACTIONAL PROGRAMMING PROBLEM IN FUZZY ENVIRONMENT

INDRANI MAITI, DR.TARNI MANDAL

Abstract: This paper presents a goal programming approach for multi-objective decentralized bi-level linear fractional programming problem (MODBLFPP) with fuzzy parameters based on Taylor series approximation. Bi-level decentralized programming problem consists of one decision maker (DM) at the first level, called the upper level DM (ULDM) and multiple decision makers at the second level. Each decision maker controls a decision vector independently. The goals of objective functions are determined by optimizing individual objective function subject to the system constraints. Then the fractional objective functions are transformed into equivalent linear functions using first order Taylor polynomial series about the optimal solution point. The objectives of both level DMs being conflicting in nature, a possible relaxation of upper level decision is considered for avoiding decision deadlock. Then goal programming approach is used which minimizes the negative deviational variables. To demonstrate the efficiency of the proposed approach, a numerical example is solved.

Keywords: Goal Programming, Bi-Level Decentralized Fractional Programming Problem, Triangular Fuzzy Number, Taylor Series.

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Abstract: We expand the notion of \( t \)-norm from Rajesh Kumar [1]. The concept of fuzzy sets was introduced by Zadeh [2] in 1965. Rosen field [3] introduced the notion of a fuzzy group as easily as 1971. The author have already introduced the notation \((\delta,\gamma)\)- fuzzy in [4] and \( t \)-norm \((\delta,\gamma)\)- fuzzy [5]. In this paper, we study the notion of \( t \)-norm \((\delta,\gamma)\)- fuzzy set and subsequently study \( t \)-norm \((\delta,\gamma)\)- anti fuzzy group (normal subgroup) and their related properties. We have also obtained a natural homomorphism from the group \( G \) to the set of all \( t \)-norm \((\delta,\gamma)\)- anti fuzzy cosets of the \( t \)-norm \((\delta,\gamma)\)- anti normal subgroup of the group \( G \). Finally, the behavior of these \( t \)-norm \((\delta,\gamma)\)- anti fuzzy subgroups (normal subgroups) under group homomorphism have been discussed.

Keywords: Fuzzy Subgroup, Fuzzy Normal Subgroup \( t \)-norm \((\delta,\gamma)\)- Anti Fuzzy Subgroup, \( t \)-norm \((\delta,\gamma)\)- Anti Fuzzy Normal Subgroup.

Mathematics Subject Classifications: 08A72, 20N25.
PROPERTIES OF MEASURES ON A $\sigma$-FIELD OF FS-SUBSETS

DR. VADDIPARTHI YOGESWARA

Abstract: In this Paper, we introduce $\sigma$-field of Fs-subsets and corresponding measure $m$ on this class of Fs-subsets and discuss some properties of $m$.

Keywords: Fs-Set, Fs-Subset, Complement of Fs-Subsets, Fs-De Morgan Laws, $\sigma$-Field of Fs-Subsets and Measure.

Introduction: Ever since Zadeh [13] introduced the notion of fuzzy sets in his pioneering work, several mathematicians studied numerous aspects of fuzzy sets. Nistla V.E.S. Murthy[10] introduced f-set in order to prove Axiom of choice for fuzzy sets which is not true for L-fuzzy sets. Nistala V.E.S. Murthy [14] introduced the f-complement of an f-subset in [14]. We can easily see that the collection all f-subsets of a given f-set with this definition of f-complement could not form a Boolean algebra. Vaddiparthi Yogeswara, G. Srinivas and Biswajit Rath introduced the concept of Fs-sets and developed the theory of Fs-sets in order to prove collection of all Fs-subsets of given Fs-set is a complete Boolean algebra under Fs-union, Fs-intersection and Fs-complements. The Fs-sets they introduced contain Boolean valued membership functions. They are successful in their efforts in proving that result with some conditions. In this paper we introduce the concept of $\sigma$-field of Fs-subsets and corresponding measure on this class and prove some results. In first three sections of this paper, we introduce Fs-sets, Fs-subset etc... in brief for smooth reading of the paper. We denote the largest element of a complete Boolean algebra $L_A$ by $M_A$ or $I_A$. We denote Fs-union and crisp set union by the same symbol $\cup$ and similarly Fs-intersection and crisp set intersection by the same symbol $\cap$. For all lattice theoretic properties and Boolean algebraic properties one can refer Szasz [15], Garret Birkhoff [16], Steven Givant • Paul Halmos [8] and Thomas Jech [17]. For results in topology one can refer[5].

Section 1:

1.1 Fs-set: Let $U$ be a universal set, $A_1 \subseteq U$ and let $A \subseteq U$ be non-empty. A four tuple $\mathcal{A} = (A, A, \bar{A}(\mu_{1A}, \mu_{2A}), L_A)$ is said be an Fs-set if, and only if

1) $A \subseteq A_1$
2) $L_A$ is a complete Boolean Algebra
3) $\mu_{1A}, A_1 \rightarrow L_A, \mu_{2A}, A \rightarrow L_A$, are functions such that $\mu_{1A}, A \geq \mu_{2A}$
4) $\bar{A}: A \rightarrow L_A$ is defined by $\bar{A} = \mu_{1A}, A \bar{A}(\mu_{2A}, x)$, for each $x \in A$

1.2 Fs-subset: Let $\mathcal{A} = (A, A, \bar{A}(\mu_{1A}, A, \mu_{2A}), L_A)$ and $\mathcal{B} = (B, B, \bar{B}(\mu_{1B}, \mu_{2B}), L_B)$ be a pair of Fs-sets. $\mathcal{B}$ is said to be an Fs-subset of $\mathcal{A}$, denoted by $\mathcal{B} \subseteq \mathcal{A}$, if, and only if

1) $B_1 \subseteq A_1, A \subseteq B$
2) $L_B$ is a complete subalgebra of $L_A$ or $L_B \leq L_A$
3) $\mu_{1B_1} \leq \mu_{1A_1}|B_1$, and $\mu_{2B} \geq \mu_{2A}$

1.3 Arbitrary Fs-Unions and Arbitrary Fs-Intersections: Given a family $(\mathcal{B}_i)_{i \in I}$ of Fs-subsets of $\mathcal{A} = (A, A, \bar{A}(\mu_{1A}, A, \mu_{2A}), L_A)$, where $\mathcal{B}_i = (B_i, B_i, \bar{B}_i(\mu_{1B_i}, \mu_{2B_i}), L_B)$, for any $i \in I$

1.4 Definition of Fs-union is as follows: Case (i): For $i \neq \Phi$, define Fs-union of $(\mathcal{B}_i)_{i \in I}$ denoted by $\bigcup_{i \in I} \mathcal{B}_i$ as $U_{i \in I} \mathcal{B}_i = \Phi$, which is Fs-empty set

Case (2): Define for $i \neq \Phi$, Fs-union of $(\mathcal{B}_i)_{i \in I}$ denoted by $\bigcup_{i \in I} \mathcal{B}_i$ as follows

\[ U_{i \in I} \mathcal{B}_i = \mathcal{B} = (B_i, B_i, \bar{B}_i(\mu_{1B_i}, \mu_{2B_i}), L_B), \]

(a) $B_i = U_{i \in I} B_i$, $B = \bigcap_{i \in I} B_i$
(b) $L_B = V_{i \in I} L_i = \text{complete subalgebra generated by } U L_i (L_i = L_B)$
(c) $\mu_{1B_i}: B_i \rightarrow L_B$ is defined by
\[ \mu_{12} x = \bigvee_{i \in I} \mu_{1B_i} x \]
\[ = \bigvee_{i \in I} \mu_{1B_i} x, \text{ where } I_x = \{ i \in I \mid x \in B_i \} \]

\[ \mu_{2B} : B \to L_B \text{ is defined by} \]
\[ \mu_{2B} x = \bigwedge_{i \in I} \mu_{2B_i} x \]
\[ = \bigwedge_{i \in I} \mu_{2B_i} x \]

\[ \bar{B} : B \to L_B \text{ is defined by} \]
\[ \bar{B} x = \mu_{1B} x \land (\mu_{2B} x)^c \]

**Fs-Intersection of Family of Fs-Subsets:**

1.5 Definition:

Case (i): For I=Φ, we define Fs-intersection of \((B_i)_{i \in I}\), denoted by \(\bigcap_{i \in I} B_i\), as \(\bigcap_{i \in I} B_i = \mathcal{A}\)

Case (2): Suppose \(\bigcap_{i \in I} B_i \supseteq U_{i \in I} B_i\) and \(\bigwedge_{i \in I} \mu_{1B_i} ((U_{i \in I} B_i)) \supseteq \bigvee_{i \in I} \mu_{2B_i}\)

Then, we define Fs-intersection of \((B_i)_{i \in I}\), denoted by \(\bigcap_{i \in I} B_i\) as follows

\[ \bigcap_{i \in I} B_i = C = (C_1, C_2, \bar{C}(1, C_2), L_C) \]

(a')\(C_1 = \bigcap_{i \in I} B_i, C = U_{i \in I} B_i\)

(b')\(L_C = \bigwedge_{i \in I} L_{B_i}\)

(c')\(\mu_{1C_1} : C_1 \to L_C \text{ is defined by} \]
\[ \mu_{1C_1} x = \bigwedge_{i \in I} \mu_{1B_i} x \]
\[ = \bigwedge_{i \in I} \mu_{1B_i} x \]

\[ \mu_{2C} : C \to L_C \text{ is defined by} \]
\[ \mu_{2C} x = \bigvee_{i \in I} \mu_{2B_i} x \]
\[ = \bigvee_{i \in I} \mu_{2B_i} x, \text{ where } I_x = \{ i \in I \mid x \in B_i \} \]

\[ \bar{C} : C \to L_C \text{ is defined by} \]
\[ \bar{C} x = \mu_{1C} x \land (\mu_{2C} x)^c \]

Case (3): \(\bigcap_{i \in I} B_i \supseteq U_{i \in I} B_i\) or \(\bigwedge_{i \in I} \mu_{1B_i} ((U_{i \in I} B_i)) \geq \bigvee_{i \in I} \mu_{2B_i}\)

We define

\[ \bigcap_{i \in I} B_i = \Phi_{\mathcal{A}} \]

**Section-2: Fs-Complement of an Fs-Subset:**

2.1 Definition: Consider a particular Fs-set \(\mathcal{A} = (A_1, A_\bar{A}, (\mu_{1A_1}, \mu_{2A}), L_{A}), \mathcal{A} \neq \Phi\), where

(i) \(\Lambda \subseteq A_1\)

(ii) \(L_{A} = [0, M_{A}], M_{A}\) is the largest element of \(L_{A}\)

(iii) \(\mu_{1A_1} = M_{A}, \mu_{2A} = 0\)

\[ \bar{A} x = \mu_{1A_1} x \land (\mu_{2A} x)^c = M_{A} \text{ for each } x \in A \]

Given \(\mathcal{B} = (B_1, \bar{B}, \bar{B}(\mu_{1B_1}, \mu_{2B}), L_B)\). We define Fs-complement of \(\mathcal{B}\) in \(\mathcal{A}\), denoted by \(\mathcal{B}^c_{\mathcal{A}}\) for \(\mathcal{B}=\mathcal{A}\) and \(L_B = L_A\) as \(\mathcal{B}^c_{\mathcal{A}} = \mathcal{D} = (D_1, D, D(\mu_{1D_1}, \mu_{2D}), L_D)\), where

(a') \(D_1 = C_B B_1 = B_1^c \cup A, D = B = A \text{ where } B_1^c = A_1 - B_1\)

(b') \(L_D = L_A\)

(c') \(\mu_{1D_1} : D_1 \to L_A \) is defined by
\( \mu_{1D, x} = M_A \)

\( \mu_{2D}: A \rightarrow L_A \) is defined by

\[ \mu_{2D} = Bx = \mu_{1B}A(\mu_{2B}x)^c \]

\( D: A \rightarrow L_A \) is defined by

\[ Bx = \mu_{1D}A(\mu_{2D}x)^c = M_A \land (Bx)^c = (Bx)^c. \]

**Fs-De Morgan Laws of Any Arbitrary Family of Fs-Subsets:**

2.2 Proposition: Given a family of Fs-subsets \( \mathcal{F} \) of \( \mathcal{A} = (A, A, M_{1A}, M_{2A}, L_A, B) \), where \( L_A = [0, M_A] \)

\[ \mu_{1A} = M_A, \mu_{2A} = 0, \overline{A} = M_A, B = A, \overline{B} = L_A \]

\( (U_{\in \mathcal{F}}B)^C_A = \bigcap_{i \in I}B_i^C_A, \) for any \( \mathcal{F} \), where \( B_i = (B_i, B_i, B_i, (\mu_{B_i}^1, \mu_{B_i}^2), L_i) \) and

provide the following relation for each \( i \in I \)

\[ \mu \leq \mu \land \mu \lor \mu \leq \mu \land \mu \lor \mu \]

(II) \( \bigcap_{i \in I}B_i^C_A = U_{i \in I}B_i^C_A \), whenever \( \bigcap_{i \in I}B_i \neq \Phi \cdot A \)-empty set of first kind.

**Section 3:**

3.1 Definition: A non-empty class of Fs-subsets \( \mathcal{F} \) of \( \mathcal{A} \) is a \( \sigma \)-field of Fs-Subsets iff

a) \( E_n \in \mathcal{F} \), for each \( n \in \mathbb{N} \) (set of all positive integers) implies \( U_n E_n \in \mathcal{F} \).

b) \( E \neq \emptyset \), implies \( E^c \in \mathcal{F} \).

Note that any element \( B = (B_1, B_1, B_1, (\mu_{1B_1}^1, \mu_{1B_1}^2), L_1) \) in \( \mathcal{F} \) is with the property that \( B = A \).

3.2 Remark: Observe that \( \Phi \cdot A \) is the Fs-empty set of second kind clearly is in \( \mathcal{F} \). We accept the Fs-empty set of first kind \( \Phi \cdot A \), denoted by the same symbol is also in \( \mathcal{F} \).

3.3 Proposition: \( E_n \in \mathcal{F} \), for each \( n \in \mathbb{N} \) implies \( \bigcap_{n \in \mathbb{N}} E_n \in \mathcal{F} \).

**Proof:** Follows from the Demorgans laws of Fs-subsets [2.2]

3.4 Definition: Define \( m: \mathcal{F} \rightarrow L_A \) by \( m(B) = [\mu_{1C}A \land (\mu_{2B}x)^c] \lor [\mu_{1B}A \land (\mu_{2C}x)^c] \)

Here \( C \in \mathcal{F} \) is fixed and \( B \subseteq C \). We call \( m \) is a measure on the \( \sigma \)-field \( \mathcal{F} \).

3.5 Remark: We accept \( m(\Phi \cdot A) = 0 \)

3.6 Theorem: \( m(C) = \overline{C} \).

**Proof:** Proof is clear

3.7 Proposition: For any \( B_1, B_2 \) in \( \mathcal{F} \) with \( B_1 \cap B_2 = \Phi \cdot A \), \( m(B_1 \cup B_2) = m(B_1) \lor m(B_2) \)

**Proof:** Proof follow from the following theorem.

3.8 Theorem: For any countably infinite Fs-subsets \( B_p, n \in \mathbb{N} \) with \( B_p \cap B_q = \emptyset \) for \( p \neq q \), \( m(\cup_{n=1}^{\infty} B_p) = \cup_{n=1}^{\infty} m(B_p) \).

**Proof:** Case (i) If \( B_p = \Phi \cdot A \) for each \( p = 1, 2, 3, \ldots \), then \( \cup_{n=1}^{\infty} B_p = \Phi \cdot A \) so that \( m(\cup_{n=1}^{\infty} B_p) = \bigvee_{n=1}^{\infty} m(B_p) = 0 \)

Case (ii) Suppose \( B_p \neq \Phi \cdot A \) for at least one \( p \)

Here assume \( B_p = (B_{1p}, B_{2p}, (\mu_{1B_{1p}}^1, \mu_{2B_{1p}}^2), L_{B_p}) \), where \( \cup_{n=1}^{\infty} B_p = D = \{(D_{1p}, D_{2p}, (\mu_{1D_{1p}}^1, \mu_{2D_{1p}}^2), L_{D_p}) \}

(a) \( D_1 = \cup_{p \in \mathbb{N}} B_{1p}, D = \bigcap_{p \in \mathbb{N}} B_p = \Phi \)

(b) \( L_D = \bigvee_{p \in \mathbb{N}} L_{B_p} \) is complete subalgebra generated by \( \cup L_{B_p} = L_{B_p} = L_A \)

(c) \( \mu_{1D_{1p}}^1: D_{1} \rightarrow L_D \) is defined by
\[ \mu_{1D_1} x = \left( \bigvee_{p \in P} \mu_{1B_{1p}} \right) x \]

\[ = \bigvee_{p \in P} \mu_{1B_{1p}} x , \text{ where } I_x = \{ p \in \mathbb{N} \mid x \in B_p \} \]

\[ \mu_{2D_1} : D \to L_0 \text{ is defined by} \]

\[ \mu_{2D_1} x = \left( \bigwedge_{p \in P} \mu_{2B_p} \right) x \]

\[ = \bigwedge_{p \in P} \mu_{2B_p} x \]

\[ \overline{D} : D \to L_0 \text{ is defined by} \]

\[ \overline{D} x = \mu_{1D_1} x \land (\mu_{2D_1} x)^c \]

\[ m(\bigcup_{p=1}^\infty B_p) = m(D)(x) = [\mu_{1C_1} x \land (\mu_{2D_1} x)^c] \land \bigvee [\mu_{1D_1} x \land (\mu_{2C_1} x)^c] \]

Where \( x \in D \) such that \( \mu_{1D_1}, \mu_{2D_1}, \mu_{1C_1}, \mu_{2C_1} \) exist and \( I_x = \{ p \in \mathbb{N} \mid x \in B_p \} \)

3.9 Theorem: \( B_1 \subseteq B_2 \subseteq L_1 \) implies \( m(B_1) \leq m(B_2) \).

Proof: \( B_{11} = (B_{111}, B_{12}, \bar{B}_1(\mu_{1B_{11}}, \mu_{2B_{11}}), L_{B_{11}}), B_2 = (B_{121}, B_{122}, \bar{B}_2(\mu_{1B_{12}}, \mu_{2B_{12}}), L_{B_{12}}) \)

\[ m(B_{11}) = [\mu_{1C_1} x \land (\mu_{2B_1} x)^c] \land \bigvee [\mu_{1B_{11}} x \land (\mu_{2C_1} x)^c] \]

\[ m(B_2) = [\mu_{1C_2} x \land (\mu_{2B_2} x)^c] \land \bigvee [\mu_{1B_{12}} x \land (\mu_{2C_2} x)^c] \]

\[ \mu_{2B_1} \leq \mu_{2B_2} \text{ implies } \mu_{1C_1} x \land (\mu_{2B_1} x)^c \leq \mu_{1C_1} x \land (\mu_{2B_2} x)^c \]

\[ \mu_{1B_{11}} \leq \mu_{1B_{12}} \text{ implies } \mu_{1B_{11}} x \land (\mu_{2C_1} x)^c \leq \mu_{1B_{12}} x \land (\mu_{2C_2} x)^c \]

so that \( m(B_{12}) \leq m(B_2) \).

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DIGITAL TRANSFORMATION AND USE OF AI IN DESIGNING GREENFIELD AIRPORT (A COMPARATIVE STUDY BETWEEN USA AND INDIA GREENFIELD AIRPORTS)

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Abstract: Airline and travel industry are ever green, always emerging, faces constantly changing technology, huge dependency on infrastructure with no room for errors. Travel industry has very less direct interaction with the customer, engaging the customer after the service is another big challenge. We need loyalty customers, better profits and lower costs yet excel in our operations and services and have a competitive edge over other players of the industry. To excel, we need 100% uptime of all our systems, zero errors, and no mechanical failures or service disappointments. How can we do that with low margins and when we are so vast and gigantic? This paper focuses on digital transformation of the industry with a special focus on Artificial Intelligence as solution in boarding and considers the critical processes like boarding, baggage claims processing and briefly touches the cockpit solutions.

Keywords: AI, Boarding experience, Claims processing, Digital Transformation, Greenfield Airport.

Introduction: Travelling for work, pleasure and other needs became an essential part of everyday life for every common man regardless of mode of transport. With the revolutionary changes in transportation field in global business scenario, the need for understanding, analyzing and constantly improving the existing facilities and thinking head of millennium demands became the necessity. Keeping the airports and railways in mind, the study focuses on analyzing and proposing innovative path applications for next generation boarding experiences in context of USA and India. The developed country like USA and developing country like India both need to focus on how we envision and learn to constantly improve things for citizen. The challenges for two countries may be different in terms of lifestyle, population/usability, technology choices or frequency or potential customers. Comparing two different countries here provides the opportunities to learn from each other. For example, for India, technology and infrastructure may be a challenge may not be so much for USA. When we study USA, the lessons from this country are useful as we develop new infrastructure or make right technical challenges in India. In India, we have a lot of population, crowd management, customer care, customer satisfaction and price point, usage of technology and usability of the same for a very diverse community/state will provide an excellent insights to USA on how to cater a wide variety of customers with a huge difference in backgrounds and how to handle huge crowds or handle a multiple different language preferences to make the unified model which can fit into every situation or for every culture/ The transportation needs and customer expectations and preferences vary widely. The current research focuses on withal given constraints, how we can accomplish the goal of developing innovative paths for future Greenfield design approach and digital transformation by incorporating AI as a tool. Digital transformation in Greenfield- Developing Innovative Paths for Next Gen Experience discusses the following areas:

- Improvising the customer experience
- Achieving 100% safety
- Incorporating the intelligence
- This research limited to
- To design the airport for NextGen Millennium Customers
- To provide the comparative study between USA and India

The Below mentioned airline data is considered for current research study.
Need and Significance of the Study: Greenfield is a design thought process where we can think of possibilities without considering previous designs or existing system constraints or any known restrictions. Under this school of thought, we consider few areas of research in airlines like cockpit solutions, boarding process or baggage and claims processing. This paper focuses on specific study on boarding process and explores the possibilities of how digital transformation can revolutionize system thinking and impact on choice of tools and techniques. This paper also provides other aspects in digital transformation and discusses future of AI in aviation sector. Various disciplines like social media, consumer behavior, customer analytics, architecture, computer designing and digital transformation solutions, marketing, big data are considered. These aspects help the researcher to identify the drivers and help to identify the right design and development tools to solve the complex business problems.

The following are some of the points that drive the need for the study:

- Every airline customer must go through the boarding process and no airline can claim that they have the best boarding process
- Due to constantly increase of the customer base and less boarding time between two flights taking off from the terminal, the boarding process has become a challenge
- Innovative study and re-imagining the airport design can help the airport authorities and airline agencies to serve the customers better. This thus increases the repeated customers
- The more intelligent systems are provided, the better designs can be taken in terms of safety and security. Data alone is not enough to deliver the solution.

Significance: Every airline industry can be benefitted by this research as the aviation industry challenges are the same. To name few challenges 100% uptime, 100% safety, increasing the customer satisfaction, customer retention and lower profit margins. Other issues like aircraft maintenance, overheads, constantly growing needs, changing technology, complex infrastructure and numerous stakeholders make the solutions less creative. Current research is highly significant as we focus on just
the solutions in greenfield designs. If we consider a boarding experience of baggage claims, it is a multivariable complex problem. Unless we think creative, we can’t solve the problem and meet the objectives of the millennium generation.

Focus Areas: Focus Area 1 - Boarding Experience: This picture explains various touch points during the boarding journey. The touch points mentioned here are not always under the control of airline authorities. As the customer travels to various boarding points, the challenges will differ. Boarding is an extremely complicated process and varies hugely based on technology, distance, airport internal architecture, weather (cancellation), distance between security and terminal, mode to reach the terminal, travelers’ preferences, airlines and technology, customer age to name few. With numerous touch points throughout the boarding process, there is a huge opportunity on how using AI. Please refer to other sections of this paper for in-depth analysis and how we can improvise the boarding experience.

Focus Area 2 - Baggage and Claims Processing:

Any global travel organization can’t operate to every corner of the world. To extend connectivity to different parts of the world, travel companies will often end up be doing joint ventures. There are some instances where the connecting airline is delayed or if the charter flight to the destination couldn’t the customer luggage along with them or if any of the legs in multi airline flight is missed, often the customer encounters problems in collecting the luggage. Reasons can be any, if the customer doesn’t get the baggage at the destination, it is not only frustrating, but also messes up the trip of the customers. Airlines usually compensate the baggage rentals or reimburse some purchases which a costly affair is. At times the customer needs to make several calls to customer service center to track the baggage and be at home when the luggage is delivered. If multi-airlines are considered this process is even more cumbersome. In case of JV’s already the profits are shared, on top of this, maintenance of customer call center, claims processing, reimbursement etc is an additional expenditure. This is a perfect example where we can use AI to resolve the issues. In case of JV’s we can run an algorithm with set of rules based on set threshold values to identify the claims, and bot can automatically process the claims. With historical data, the algorithms can be well trained, and we can configure and adjust the claims model based on the changing needs. Once the primary airline applies the claim, JV airlines claims can also be automatically processed/ request can be sent in the meantime by using bot. This not only saves the time, but also removes the human errors and delays.

Problem Statement for Focus Area 1: 60% of the boarding problems are reported in the form of less satisfaction which also reflected on many social media. Re-imagine the boarding experience and make it seamless for best customer experience to every customer by combining many cross functional domains by studying in-depth analysis.
Sources of Data: The source of data or the proposed study would be both primary and secondary sources. Primary data will be collected from the sample respondents, observations, interviews and the secondary data will be collected from related research works, published books, journals and internet. The primary data will be collected through a structured questionnaire from the sample respondents at various airports and airline customers. We can also consider online surveys. The data is collected from surveys, social media, interviews personal & Groups exclusive for this study. Convenience sampling, random sample is used to collect the data from the respondents. It’s a non-probability sampling technique in which elements have been selected from the target population based on their accessibility to convenience to the researcher. The study is conducted to study the onboarding experience for the travelers in India and USA with major airlines. Social media data is going to give the global perspective of the travelers based on the certain criteria. The sample size for questionnaire for India and USA each is targeted to 1200 customers. The customer responses are collected using structured questionnaire developed on the factors considered for the study and the data is analyzed using appropriate statistical methods. To identify the major factors that influence boarding experience. The data can be classified into domestic and international travel: cross tabulated and processed its findings in a systematic manner. Chi Square test, and ANOVA, algorithmic models for multi-variable analysis and Queuing theory will be used for the collected data. Multi point liker scale is used to measure the boarding experience. The data is collected is in the form of text, pictures, video and also in voice format. The analysis of this data needs big data analytics to transform the unstructured data into a structured format for storage and analysis. Data is converted into structured format of tables and cubes. Then the algorithms are built and outcome of the same is shown in the graphical view for this paper reference. Please refer to the below mentioned analytical results for insights:
Emotional Vs non-emotional Factors identified in survey:

![Graph showing emotional vs non-emotional factors](image)

Interview results on emotional vs non-emotional antecedents

![Chart showing emotional reactions and antecedents](image)

Bigdata Collected From Different Airport Samples:

![Images of airport samples](image)
Data collected and survey responses:

Details of survey results:

Survey responses over time
Emotions over time

![Emotions over Time graph]

Emotions per tier member

![Emotions per Tier Member graph]

N-Gram for varying lengths

![N-Gram for varying lengths table]
Basic Regression Analysis

Illustrated Basic regression

Cognitive Processed- continue regression:
Note: All these graphs are generated as a result of algorithms we used in boarding process. The logic for these algorithms will be presented along with data in a detailed manner as part of my final thesis.

**Key Findings Based On Data Analysis Resulted For Focus Area 1 & 2:**
- Baggage (handling, check-in, storage on airplane) is relevant (storage on board and access)
  - Passengers are aware and think about the ‘appropriate’ boarding procedure (order of boarding; from back to front, window to aisle, etc.)
  - Feel informed in terms of expertise (claim to know it better)
- ‘Certainty’ and ‘Inclusiveness’ represent two major psychological mechanisms that affect the ‘customer experience’ (satisfaction, likelihood of recommendation)
  - Certainty is linked to comments/feedback that focuses on the baggage/carry-on issues
  - Inclusiveness is linked to expectations/recommendations for boarding procedures

**Tools and Techniques to Address The Key Findings:** Based on the objectives of the research the data collection, analysis is conducted and identified key findings. For focused areas 1 & 2, the problem is very complex as it touches the business process which needs re-engineering, customer analytics and consumer behavior needs shift of thought process, systems thinking needs new tools and techniques. The possible solution to address the multivariable dependent on infrastructure, people, process and systems is through digital transformation.

**What is Digital Transformation:**

Digital transformation is the transformation of society by using digital technology to accomplish simplicity, speed, agility, adoptability and provide secured solutions. With digital disruption in technology, recent shift to cloud storage, smart mobile application, Social media tools and analytics, IoT and AI, the organization have now 360 shift on traditional approaches on how they are currently doing their business. With many new tools and applications are available, every organization literally considering digital transformation. Some achieve 100% digital transformation by 2020 like Saudi Arabia education division. Based on the organization maturity levels, adoptability of team members, the digital transformation goals can be established. Some domains are more complex in implementation than the rest. Digital transformation is a momentum it starts with going digital and ends with doing digital.
The digital transformation is not one step process, it is multiyear culture shift process. Some of the core elements of digital transformations can be to improve customer understanding, customer touch points, modifying the business, increase the growth, process optimization, digitization and thus achieving the performance excellence. This paper focuses on customer touch points for travel industry and case studies are presented focus on how to establish the single focus of customers, strategies on providing the better customer satisfaction.

**Digital Transformation Process:**

Digital transformation as stated above is a multiyear process focuses on new thought process of culture change, shift in thought process, from thinking agile to performing and being agile, business and IT alignment etc. In order to evolve to the state of completely transformed, consider the stages below:

- Business as usual
- Digital literacy to educate the team
- Formalizing the plan for digital transformation
- Taking strategic initiatives
- Converge in action plan
- Innovate solutions
- Transform

Depending on the organization maturity levels, some may be little more advanced than the rest. Instead of jumping or skipping a stage, if we are following the above 7 step process, we can accomplish better goals, sustainable growth and manageable conflict. The main pillars for the success as always been people, process.

**Game Changers in Digital Transformation:** Technology makes a big role in Digital transformation. There are many areas that we can consider for digital transformation. Based on the goals of the organization we can show agility, performance, speed and high ROI. Some of the areas that are considered in this space focus on automation of processes, testing, faster and quicker deployments and incorporating the dev ops tools, Digital tracking of the infrastructure and assets, sharing the contracts, artifacts etc via block chain, connecting all the tools via IoT applications to name few. Organization digital maturity, domain and the specific goals can drive the results. This paper now focuses on specific cases of AI and the difference it can make in the digital community.
Connecting all devices like scanners, phones, digital assets, physical assets, cameras, vehicles, appliances etc via IoT is not only a revolutionary thought, but also adds lot of value and reduces monitoring lot easier.

While the organizations implement RFID and many other tracking systems and connect them through custom mobile apps. Through IoT we can control better the devices, predict the down time and schedule monitoring and can do completely programmed solution through mobile apps. Airport is a complex system and needs coordinating and connectivity of various systems, hardware devices, machines in order to perform well.

Dev Ops is the utilization of lean and agile techniques to combine development and operations into single IT value stream. When Dev Ops is combined Infrastructure, business is taken into next level by IT. This helps to have programmability and can give the visibility between current to desired solution. These things are easily scalable when added big data, machine learning data as we add programmability, the agility is achieved. Dev ops expedite the quicker deployments by automating the deployments, configuration, monitoring many environments. Good way to save costs, gain agility and eventually target to digital transformation of the organization.
AI is one of the hottest topics in the IT world. Many of us might have already started using it in the form of Microsoft office products, Google home, Alexa or Apple home or a self-driving car. We are most exposed to consumer electronics side of AI. Transportation and health care is early adopters of AI as these machines are trained with tons of images in several thousand hours of training. The collected images vs stored images are compared and with the programmed algorithms, we accomplish many tasks. We will discuss in detail about a case study in airline industry which can save tons of time and reduces conflicts and provides the better customer services. AI usage is a game changer in airline industry and more specifically in JV.

Block chain is another hottest area in digital transformation. The distributed, decentralized network, peer to peer transformation, transparency of pseudonymity, irreversible records and computation logic make this technology much more adoptable and trustable everywhere the source to all transaction tracking is the key. Many applications are proposed by using this technology are in POC status. In airline, when we make the tracking documents available between JVs and between different logistics teams, we can save enormous amount of time. The block chain applications can go beyond financial assets. Information about provenance of goods, identity, credentials and digital rights can be securely stored with DL. Though it is challenge, but it can be tracked physical assets, resources, credentials and other relevant events by using this technology. Good technology to experiment in going digital transformation.

How Digital Transformation And AI Helps To Resolve The Greenfield Airport Design?
This paper touched briefly 5 focus areas and now let us discuss how each area can be addressed through digital transformation as a tool. As we already know Digital transformation is not a single tool or a technique, but a thought process which combines a variety of tools. Each focused area is different and solutions for each of the problems will also vary though we see few commonalities in each.

Focus Area 1- Boarding Experience- Solution:

<table>
<thead>
<tr>
<th>Problem</th>
<th>How to make boarding experience a seamless experience?</th>
</tr>
</thead>
</table>
| Sub-focus areas to consider | Gate redesigning  
| | Systems redesigning  
| | Display board redesigning  
| | Notification push & Mobile app  
| | System integration for JV’s  
| | In-airport GPS design and implement  |

| Reasons for complexity | Multiple steps and multiple locations to track  
| | Infrastructure dependency  
| | Language barrier  
| | Limited space constraints  
| | Global data collection constraints for biometrics  
| | Joint venture dependencies  
| | No single process works for different gates or different airlines or different locations |
Digital transformation role

Perfect example where we can education, transform and perform the digital transformation.

Specific tools to be applied

Dev Ops for multiple deployments
AI in predicting the pain areas and quickly addressing the problems based on historical data
Implementation of Biometrics for seamless experience
IoT for tracking the scanners
Enhanced mobile apps for pushing notifications
Implement built-in GPS for each station and automatic navigation to the gate
API development and deployment for data exchange
Redesigning the business process to get aligned with systems thinking
Physical layout at gate to reflect the effective usage of space
Notification display and effective utilization of the display board via uniform way of displaying boarding notifications

How AI can help in short term

By predicting the
Customer tolerance
Customer boarding satisfaction levels
Delays in boarding and providers drivers for systems thinking
Delivers the metrics based on the initial checking at security to onboarding

Future of AI in Boarding

Will continue to play major significant roles in predictive analytics, automating bot check-ins, increased use of biometric and intelligent solutions coupled with AI solutions with GPS solutions, providing the joint partnership solutions and single view of customer boarding status can be easily solved by using AI.

Focus Area 2 - Baggage and Claims Processing

Problem
How to effectively track bags and reduce the claims or reduce the time taken for claims processing

Sub-focus areas to consider
Bag tag tracking, Bag tracking and claims processing in JV’s

Reasons for complexity
Multi-leg travel, Multiple airlines coordination for Joint ventures, No uniformity in bag tag reading, missing notifications, no data visibility between multi-airlines, cumbersome and stringent rules and different cycle time for claims processing

Digital transformation role
Business process redefining and unconstrained design thinking with more effective tool implementation, being thinking agile to performing agile can be accomplished by applying digital transformation principles to this business problem

Specific tools to be applied
IoT and permanent Bag Tag and Dev Ops
Dev Ops for deployment
AI in early detecting the baggage loss, predicting the delays early on

How AI can help in short term
AI in predicting the bag claim and missing baggage
Incorporating AI in baggage processing to expedite when the claim is recorded
Robots to search the bags and answer the queries on claims
Automatic claims processing based on the rules set for joint ventures and providing clear visibility to the customers
RFID, IoT, wearable devices all are interconnected and monitored through monitoring tool and use AI and bots to assist in queries, tracking unified perm bag tags and process the claims in JV.

IoT @ Baggage and benefits of Collaborating platform:

Conclusion: All organizations are now in the phase of unlearning their traditional ways of doing the business and relearning the tools and techniques towards business enablement. One of the business enablers is “Digital Transformation. From doing agile to being agile, from tracking devices to connecting devices, from managing the environments to automating the environments, incorporating intelligence in everything we do is the new mantra of success. Digital transformation is a multi-step and multi-year process. The travel industry can hugely benefit from being agile to performing agile which also include complete transformation of the business and aligning with IT. Tools, techniques, processes, people all need to undergo change to be transformed. We can use IOT, Block chain, Data science, Dev Ops, Automation and AI to achieve digital transformation. The data is collected, algorithms are built, and systems are to be well trained to implement the above solutions. We can always do in iterative method.

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POST CONSTRUCTION ASSESSMENT OF THE EFFICIENCY OF THERMAL COMFORT WITHIN SPACES IN RESIDENTIAL BUILDINGS: A CASE OF GOVERNMENT HOUSING ESTATES IN NIGERIA

AYENI CONQUEROR AYOARIYO, DR. RATNAKAR D BALA

Abstract: Natural ventilation is created and generated by pressure differences between the outside and the inside of the building; this pressure difference may be wind-driven or due to air temperature difference. The study assesses the efficiency of thermal comfort within the living room and bedrooms in the residential buildings in South-West Nigeria. Givoni Mathematical model was used to calculate the indoor air velocity and data obtained were analysed using descriptive statistics. Givoni empirical model indicated that none of the spaces investigated (living room and bedroom) satisfied ventilation comfort standard of between 0.5-1.5m/s for warm humid climate. The highest Thermal comfort was obtained in buildings with casement window with indoor air velocity of 0.40m/s while the worst thermal comfort was found in buildings with sliding windows having 0.21m/s indoor air velocity. The study concluded that with the use of casement and louvre window types placed on a sill height of 0.9m, thermal comfort can be improved in residential buildings.

Keywords: Living Room, Bedroom, Casement, Louvre, Air Velocity, Residential Buildings, Thermal Comfort, South-West Nigeria.

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COMMUNICATION CONCEPTS AND DEVICES

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Abstract: The branch dealing with principles and methods by which information conveyed is called communication. It is a universal phenomenon happening between living and nonliving things like robot. The production and exchange of information using either signs or symbols or both is the main process. This process involves sending messages after encoding, receiving and decoding, and synthesizing information. Context is one which sender chooses the message to communicate. Source produces sequence of messages to communicate to the receiving terminal. Sender may be an individual or a group or an organization that sends the message using symbols to convey the message in a proper channel. Channel is the medium used to transmit the signal from transmitter to receiver like air medium, wire and fiber optics, etc. Recipient/Decoder is a person or a thing for which the message is intended. The communication engineering also deals with the electronic devices, circuits, communication equipments like transmitter, receiver, integrated circuits (IC), etc. It also deals with different types like analog and digital transmission & reception of data, voice and video (such as AM, FM, DTH), microprocessors, satellite communication, microwave engineering, antennae and wave progression. In recent communication, Internet of things and Artificial intelligence plays a major role in the technological front of this world.


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AN OVERVIEW OF ARTIFICIAL INTELLIGENCE AND MACHINE-LEARNING

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Abstract: Artificial Intelligence (AI) is a huge field in computer science. It is a branch of computer science that highlights the manufacture of intelligent machines that work and respond like humans. Hence it has become a vital part of computer engineering. The present paper tried to investigate the full extent of the field, which covers logic, probability, perception, reasoning, speech recognition, learning, and action from microelectronic devices to robotics. The implementation of machine-learning methods can be seen all through science, technology and business, leading to more evidence-based decision-making in health care, manufacturing, teaching, financial modelling, policy making, and marketing. Like in any other enterprise, artificial intelligence (AI) will probably have a major impact in various branches of science technology. In this review article, I would like to highlight a myriad of applications for machine learning in the life sciences and health care industry.

Keywords: Artificial Intelligence (AI), Machine-Learning, Programming Computers.

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Abstract: The present investigation assessed toxic effects of aquatic pollution on fish collected from the contaminated station of Chambal River. Both water and fish (Mystus tengara) samples were collected from upstream and downstream of Chambal River at Nagda, Ujjain (M.P. India). Water quality parameters of the water were assessed and fish were used to study the various blood parameters. The changes in haemoglobin concentration, red blood cells, and white blood cell count were studied. The secondary blood indices were also calculated. Compared to the reference site, the fish from the downstream shown decreased numbers of RBC, Hb and Hct. However the values of WBC count, and Mean Corpuscular Volume (MCV) increased significantly. The Mean Corpuscular Haemoglobin Concentration (MCHC) values were significantly reduced. These outcomes advocate that fish from the polluted station revealed alterations in haematological responses, which possibly point out the health disturbances. Additionally, the results suggest that blood parameters are useful, tools in the monitoring of aquatic pollution. These biomarkers show that fish have macrocytic hypochromic anaemia. Leucocytosis showed general defence response against the pollution-induced toxicity. In conclusion, the results acquired from the current study shown that the fish Mystus tengara at downstream was exposed to pollution-induced stress that caused a significant reduction in Hb, RBC and Hct values but increased the clotting time, ESR and WBC values. Water from the downstream has strong potential to induce stress making the fish anaemic, weak, and vulnerable to diseases.

Keywords: Biomarkers, River Pollution, Haematological Parameters, Mystus Tengara.

Introduction: Though industrialization has brought economic affluence but it also resulted obvious stress by discharging huge waste into the soil and water [1],[2],[3]. Xenobiotics and heavy metals present in wastewater could cause negative effects on the flora and fauna. Fishes are extensively used as biomonitoring organisms in ecotoxicological studies as they are sensitive to the probable risks of contaminants introduced in the aquatic environment.[4][5],[6] Fish are sensitive and very vulnerable to alterations of water quality, which possibly reflected in their blood components. ([1][5],[7] The endurance, distribution, reproduction, and normal metabolism of fish depend on water quality parameters. Blood parameters are most vital markers of the physiological stress that reflect the endogenous or exogenous changes in fish.[1],[3],[7],[8],[9]

Blood indices can offer adequate information about the overall health status and physiological response of fish to environmental changes that affect homeostasis.[3],[7],[8],[10],[11] Haematological studies facilitate us in understanding the association of blood indices to the habitat and adaptability of the species to the environment. A huge number of intrinsic and extrinsic factors cause variations in haematological data. [7], [12], [13] Therefore, haematological studies are significant for ecological monitoring of fish and their health status as they are so closely linked with the aquatic environment. Even though, fish haematology maintains to offer an important tool, but the progress in establishing normal range values has been sparse and information in this area is still incomplete. For that reason, a number of haematological indices such as haemoglobin (Hb), haematocrit (Hct), total erythrocyte (TEC) and total leukocyte counts (TLC), and mean corpuscular haemoglobin (MCH) are considered to measure the health status of the fish and ecological pollution. Therefore, the present study is aimed to evaluate haematological parameters of the fresh water fish, Mystus tengara from upstream and downstream of the Chambal River at Nagda (India). The information generated from this study may offer a valuable databank for upcoming investigations of pollutant effects on haematological parameters in aquatic environment.

Material and Methods: Study Area: River Chambal at Nagda town (23°27′N and 75°25′) receives wastewater from various industrial units and sewage from municipality of Nagda town. The surface water samples from upstream and downstream of the River were collected in December 2018 at almost
10 cm below the surface. Acid rinsed glass containers were used for collection. Collected samples were processed for the analysis of various physicochemical parameters and heavy metals in water according to the protocol given by APHA. [14]

**Fish:** Live samples of fish *Mystus tengara* (n = 10), (8.2 ± 0.7 cm; 7.1 ± 0.4 mg) (irrespective of the sex) were collected from upstream (Reference site) and downstream (polluted site) of the River during winter months of 2018 with the help of local anglers. They were immediately transferred to laboratory independently for further haematological studies.

**Haematological study:** Blood sample was collected by cardiac puncture using disposable syringes and kept in separate vials. Haematological parameters like Hb, RBC, WBC, ESR and PCV were estimated following the procedures of Wintrobe, [15] and Sood, (1996)[16]. Mean cell haemoglobin concentration (MCHC), Mean cell haemoglobin (MCH), and Mean cell volume (MCV) were calculated using the formulae mentioned by Dacie and Lewis (2001).[17]

**Statistical analysis:** The data observed in the experiment were statistically analyzed for the calculation of standard error (S.E.) and student’s test was administered for testing the hypothesis with the help of computer software excel program. The data shown are the averages of three replicates ± S.E.

**Results:**

**Water Quality Parameters:** Major fluctuations in the water quality of Chambal River at Nagda were detected between the study stations. The site located at downstream of the River was characterized by poor water quality conditions. The results of water quality parameters of Chambal River at Nagda are presented in Table 1.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Upstream</th>
<th>Downstream</th>
<th>% Change over reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature °C</td>
<td>22.4±0.33</td>
<td>22.9±0.74</td>
<td>2.232</td>
</tr>
<tr>
<td>DO mg/L</td>
<td>7.4±0.42</td>
<td>4.6±0.5</td>
<td>-37.83</td>
</tr>
<tr>
<td>pH</td>
<td>7.1±0.09</td>
<td>8.8±0.89</td>
<td>23.94</td>
</tr>
<tr>
<td>TDS mg/L</td>
<td>110.10±5.3</td>
<td>392.5 ±5.3</td>
<td>256.49</td>
</tr>
<tr>
<td>Total hardness mg/L</td>
<td>200.5 ±9.67</td>
<td>1296.7±9.67</td>
<td>546.73</td>
</tr>
<tr>
<td>TSS mg/L</td>
<td>26.1±2.2</td>
<td>136.7±4.6</td>
<td>423.75</td>
</tr>
<tr>
<td>BOD mg/L</td>
<td>7.6±0.45</td>
<td>52.4±3.2</td>
<td>589.47</td>
</tr>
<tr>
<td>COD mg/L</td>
<td>11.6±1.01</td>
<td>32.3±2.4</td>
<td>178.44</td>
</tr>
</tbody>
</table>

Results point out that virtually all water parameters calculated were higher than the accepted limits laid by the Central Pollution Control Board (CPCB) [18]. Most of the assessed parameters shown poorest values at station 2, displaying the worsening of water quality at this station. The discharge of both municipal sewage and industrial pollution contribute to this fall in water quality. Moreover, the low levels of dissolved oxygen observed at station 2 are the result of the increase in BOD, bacterial activity as well as to the rise in the ammonia nitrogen, leading to oxygen consumption downstream from the city sewage discharge.
Haematological Parameters: The results of blood analyses (n=10) are given in Table 2. The Hb percentage is significantly decreased (-11.326%) in the fish exposed to pollution.

Table 2: Changes in Haematological Parameters in Freshwater Fish, M.Tengara

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Reference fish</th>
<th>Exposed fish</th>
<th>% Change over reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hb%</td>
<td>10.33±0.06</td>
<td>9.16*±0.08</td>
<td>-11.326</td>
</tr>
<tr>
<td>RBC (x10^6/mm³)</td>
<td>3.95±0.04</td>
<td>3.11*±0.12</td>
<td>-21.26</td>
</tr>
<tr>
<td>WBC (x10^3/mm³)</td>
<td>62.88±0.27</td>
<td>89.13*±1.33</td>
<td>41.74</td>
</tr>
<tr>
<td>Hct%</td>
<td>43.42±1.20</td>
<td>28.31*±1.01</td>
<td>-34.79</td>
</tr>
<tr>
<td>ESR (mm/hr)</td>
<td>8.23±0.57</td>
<td>16.94*±0.88</td>
<td>105.83</td>
</tr>
<tr>
<td>CT/Sec</td>
<td>49.54±0.03</td>
<td>58.88*±0.15</td>
<td>18.85</td>
</tr>
<tr>
<td>MCV</td>
<td>144.36±6.05</td>
<td>126.42*±7.59</td>
<td>-12.42</td>
</tr>
<tr>
<td>MCHC</td>
<td>24.11±0.82</td>
<td>27.16*±1.37</td>
<td>12.65</td>
</tr>
<tr>
<td>MCH</td>
<td>34.87±0.61</td>
<td>25.72±2.10</td>
<td>-26.24</td>
</tr>
</tbody>
</table>

MCV= mean corpuscular volume, MCHC= mean corpuscular haemoglobin concentration, MCH= mean corpuscular haemoglobin. Values are mean of three replicate SE and (*) significance of P<0.05

The RBC number (-21.26%) and Hct percentage were decreased significantly in the exposed fish when compared to the fish from reference site. However,a significant increase in total white blood cells (WBC) count over the controls was observed (41.74%). The erythrocyte sedimentary rate (ESR) and clotting time (CT) registered an increased trend significantly (105.83% and 18.85%) in the fish of downstream in compare with control.The mean corpuscular volume (MCV) value and mean corpuscular haemoglobin (MCH) values decreased (-12.42% and -26.24%) in compare with control fish while mean corpuscular haemoglobin concentration (MCHC) values increased (12.65%) in comparison with control fish.

Discussion: Blood is a pathophysiological reflector of the whole body. Aquatic animals are often exposed to various stressors like excess crowding, transport, and pollution, can directly reflect in various biological and haematological responses. Therefore, the study on the changes of haematological parameters of fish can provide a valuable information in the identification of stress, environmental contamination and pathology.[1],[3],[7],[8],[11],[19] Changes in these indices from reference give an indication of disease. Low TEC usually leads to low PCV and Hb levels, which has also been observed in the current study.
In the present study, Hb percentage, RBC content and Hct values significantly decreased in the fish of downstream. In contrast, WBC counts, ESR, CT and MCHC values were found notably increased compared to control fish. Reduction in total erythrocyte count, haemoglobin percentage, and Hct values indicates the occurrence of anaemia. Hb seems to be the best blood indicator of environmental stress.[20] Besides, behavioral and morphological adjustments, fish has to adjust to low oxygen levels by altering several physiological and biochemical parameters.[21] Earlier investigations have also reported low DO levels at this station. [3], [22]. Nevertheless, we cannot reject the effects of other pollutants (xenobiotics, pesticides, ammonia, heavy metals, etc.) present in the downstream. The reduction in haemoglobin value perhaps due to distraction of iron synthesis in fish exposed to polluted water.

The decrease in total RBC, haemoglobin percentage and Hct values in the present study perhaps due to the damage of mature RBCs or inhibition of erythropoiesis by cocktails of pollutants in River. One more possible explanation for the reduction in RBC and HB may be due to the cytotoxic effects of pollutants on the hematopoietic tissue as in *Heteropneustes fossilis*.[23],[24] Decrease in haemoglobin concentration may perhaps due to pollutants induced production of reactive oxygen species (ROS) which might cause the destruction of the cell membrane of erythrocyte and its function.[25],[26] Another possible explanation for the decrease in blood indices may be due to haemolysis and haemodilution, a manner of diluting and reducing the effect of the toxicant/pollutants.[28] The higher number of WBC in the exposed probably might be due to the stimulation of the animal’s defense mechanism and the immune system by pollutants. Most of the oxygen inspired by fish (95%) is utilized for ATP production. Fish react to hypoxia with mixed behavioral, functional, and cellular responses to maintain homeostasis and functional physiology in low oxygen environment (hypoxia). The decreased levels of RBC, Hct and Hb concentration in the present study maybe demand a well-coordinated comeback to obtain more oxygen from the depleted environment. Conversely, leucocytes are mainly involved in phagocytic and immune responses. The increase in the number of leucocytes (leucocytosis) in the present study is a common response against the entry of contaminants. Accordingly, higher number of WBC count was observed in fish at downstream could be caused by heavy metals exposure or probably a complex mixture of pollutants could be occurring due to mixing of both urban and industrial waste. [1], [3]

The changes in the number of white blood cells are the natural response on the exposure to toxicant.[27], [28] In the present study, WBC count (Table 1) is significantly increased in the fish exposed to pollution at downstream, which may be due to stimulation of the defense mechanism of the fish to counteract the stress of toxicant. Similar results were recorded on the toxicity and recovery of insecticides on haematological parameters in *Labeo rohita* [29] and *Cyprinus carpio*. [30] The hematocrit (Hct) values are significant to determine the effects of a stressor on the health status of fish and are used to determine the oxygen carrying capacity of blood. Variations in Hct happened in the fish of downstream under hypoxic conditions. The significant increases in Hb concentration in were complemented by increases in the number of erythrocytes perhaps to raise the blood oxygen capacity in order to supply more oxygen to the tissues under hypoxic conditions. We also noticed that the changes in haematological parameters are associated with low levels of dissolved oxygen (DO). The reduction in blood values might also be due to the disrupting action of water contaminants on erythropoietic tissue, which consecutively induced anaemic condition in fish of downstream. The decrease of RBC is mostly due to development of hypoxic condition, which successively leads to increase in the destruction of RBC or decrease in the rate of formation of RBC due to non-availability of Hb content in the cellular medium. [31] The anaemic condition in fish results from an abnormal decrease of erythrocytes or with little amount of haemoglobin.[32]
The increase in ESR levels in the fish of downstream possibly due to Pollutants (heavy metals and xenobiotics) induced oxidative stress and caused tissue damage, anaemia, neoplasia an increase in fibrinogen.[2], [3] A clot is formed as the product of blood coagulation. The clot under normal conditions undergoes contraction when serum is expressed from the clot, and finally, the clot becomes denser. The blood clotting substance in fish blood is prothrombin, which is present in a high percentage. However, it is less than that of mammalian blood level. A substance released by the platelet (thrombos then in) is responsible for clot retraction. Water pollution caused a significant decrease in RBCs count, Hb and PCV values, in the in Channa punctatus along with acute anaemia. [33] Similar results were also reported in Labeo rohita [34] and in Channa punctatus exposed to tannery effluent. [35] Conclusions: The results acquired from the current study clearly displays that the fish M.tengara at downstream was exposed to pollution-induced stress that caused a significant reduction in Hb, RBC, and Hct values but increased the clotting time, ESR and WBC values. In conclusion, the results acquired from the current study shown that the fish M.tengara at downstream was exposed to pollution-induced stress that caused a significant reduction in Hb, RBC, and Hct values but increased the clotting time, ESR and WBC values. Water from the downstream has strong potential to induce stress making the fish anaemic, weak, and vulnerable to diseases. This study will be beneficial for upcoming research in explaining the detailed effects of river pollution in other fish species. The information generated from this study may offer as a valuable databank for upcoming investigations of pollutant effects on haematological parameters in an aquatic environment.

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A SURVEY OF SOME ETHNOMEDICINAL PLANT OF RAISEN DISTRICT (M.P.)

DR. RACHANA SAXENA

Abstract: Present paper reports 20 plants of ethnomedicinal importance of Raisen district, (M.P.) Some of plants such as *Adhatoda vasica* Nees, *Achyranthus aspera* Linn., *Carissa spinarum* Linn., etc. are well medicinal plants and used in several different diseases like - cough and cold, piles, fever etc. The study is based on a survey of Raisen district (M.P.)

Introduction: Raisen district lies between 77°-21' and 78°-49' East longitude and 22°-47' and 25°-45' North latitude. It is situated almost in the centre of madhya pradesh and is bounded by Vidisha and Sagar district in north, Sagar and Narsinghpur district in east and Bhopal district in west. Medicinal plants found in the area of great medicinal value for different diseases such as cold and cough, Anaemia, Stomach pain, fever etc.

Material And Methods: The survey reported in this study was performed during the study period and was confirmed to the villagers of Raisen district. The first hand information of plants were collected from the places where the local people have been using them.

Enumeration: The plants listed below were arranged alphabetically with their local name, family and medicinal uses. A total 20 plants species were collected during the study period:

1. *Adhatodavasica* Nees.
   - Local name- Adusa
   - Family- Acanthaceae
   - Uses: Leaves of the plant and leaves of Gurbel plant (*Tinospora cordifolia*) are boiled together and extract is taken cure cough and cold.

2. *Achyranthus aspera* Linn.
   - Local name- Adharjhara
   - Family- Acanthaceae
   - Uses: Dried seeds powder mixed with water in the ratio of 1:1 is given as cure for piles.

   - Local name- Sitaphal
   - Family- Annonaceae
   - Uses: seeds powder is taken for the treatment of stomach pain.

4. *Carissa spinarum* Linn.
   - Local name- Karonda
   - Family- Apocynaceae
   - Uses: paste of root bark is applied as cure malignant ulcer.

5. *Citrus medica* Linn.
   - Local name- Bajura
   - Family- Rutacear
   - Uses: The aqueous extract of the root with black pepper is given to bring abortion.

   - Local name- Kumvi
   - Family- Barringtoniaceae
   - Uses: leaf paste is applied on the face to reduced the swelling.

7. *Cordia dichotoma* Forst.f.
   - Local name- Russalla
   - Family- Boraginaceae
   - Uses: Decoction of leaves with comman salt(3:1) is taken as cure for cough and cold.

8. *Chenopodium album* Linn.
   - Local name- Bathua
   - Family- Chenopodiaceae
   - Uses: whole plant is used against anthelmentic.
9. **Diospyros melanoxylon** Roxb.
Local name- Tendu
Family- Ebenaceae
**Uses**: Decoction of stem bark (2 gm.) is taken orally in diarrhoea.

10. **Euphorbia thymifolia** Linn.
Local name- Choti dudhi
Family- Euphorbiaceae
**Uses**: Approximate 15 ml. decoction of root is given to women for the treatment of amenorrhea.

11. **Ficus religiosa** Linn.
Local name- Peepal
Family- Moraceae
**Uses**: Decoction of stem bark is used for wash of mouth sore.

12. **Grewia asiatica** Linn.
Local name- Phalsa
Family- Tiliaceae
**Uses**: Paste of root bark is applied on skin diseases.

13. **Helicteres isora** Linn.
Local name- Marorphali
Family- Sterculiaceae
**Uses**: Decoction of fruits is taken twice in a day against stomach pain.

14. **Ixora arborea** Roxb.
Local name- Lokhandi
Family- Rubiaceae
**Uses**: Decoction of stem bark is taken twice in a day up to 10 days in anaemia.

15. **Lantana camara** Linn.
Local name- Satrangi
Family- Verbenaceae
**Uses**: Approximate 15 ml. decoction of plant is given to patients for the treatment of tetanus. They do not allowed any sore food during treatment period.

16. **Manilkara hexandra** (Roxb.) Dub.
Local name- Khirni
Family- Sapotaceae
**Uses**: Stem bark (30gm.) is used thrice in a day for 10 days as a tonic.

17. **Madhuca longifolia** (Koening) Macbride
Local name- Mahuwa
Family- Sapotaceae
**Uses**: Seeds oil is applied as cure for skin diseases.

18. **Semeicarpus anacardium** Linn.
Local name- Bhilawa
Family- Anacardiaceae
**Uses**: Decoction of stem bar is applied for washing septic wounds.

Local name- Sarponkha
Family- Fabaceae
**Uses**: Decoction of root along with that of the root of *Stereospermum suaveolens* decoction is given after menstruation to check conception.

20. **Tinospora cordifolia** (Burn.f.) Wall.ex.Nees.
Local name- Gurbel
Family- Menispermaceae
**Uses**: Plant decoction is given in the treatment of fever.

**Acknowledgment**: The author is thankful to the Dr. J.R. Ahirwar, Head of the Botany department Govt. B.S. P.G. College, Jaora, Distt-Ratlam (M.P.) For identification of plants.
References:


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IDENTIFICATION OF POTENTIAL GENOTOXIC IMPURITIES IN ACTIVE PHARMACEUTICAL INGREDIENTS OF THE STRIBILD® BY LC-MS

DR.A.K.M.PAWAR, U.HARINI

Abstract: Genotoxic impurities are unwanted chemicals, have no therapeutic value and are potentially harmful which cause genetic damage, cell death, neoplastic transformation. These impurities at trace levels, are of increasing concern to both pharmaceutical industry and regulatory agencies as a potential human carcinogenic substance, hence they need to be controlled in active pharmaceutical ingredients and degradation products. Stribild® is a marketed formulation of four drug combination (Emtricitabine, Tenofovir disoproxil fumarate, Cobicistat and Elvitegravir) used in treatment of human immune deficiency virus (HIV).

Liquid Chromatography - Mass Spectrometry (LC-MS) is a powerful analytical technique that combines the resolving power of liquid chromatography with the detection specificity of mass spectrometry. Liquid chromatography (LC) separates the sample components and then introduces them to the mass spectrometer (MS) which creates and detects charged ions. A validated LC-MS method was developed to quantify genotoxic alkyl methyl sulfonates such as Methyl methane sulfonate (MMS) ,Ethyl methane sulfonate (EMS) in API’s of Stribild® at trace level concentration. The effectiveness of the method was ensured by validation of it according to ICH guidelines. Hence the method well suits for the intended purposes and can be successfully applied for the testing of Stribild® into the market.

Methyl methanesulfonate (MMS) and ethyl methanesulfonate (EMS) have been highlighted as potential genotoxic impurities (PGIs). A sensitive LC/MS method is developed and validated for the determination of MMS and EMS impurities in Active pharmaceutical ingredients of Stribild®. Method utilizes, an Agilent Infinity series 1260 HPLC system equipped with quaternary pumps G1311C, Degasser G4225A, Auto sampler G1329B, Thermostatted column compartment G1316A with 6230 TOF LC-MS model G62308 serial # SG17300101, Agilent Mass Hunter work station software version B.08.00 was used with electronspray ionization for quantification of impurities. The major fragments for MMS and EMS were observed at m/z ratio 65, 79, 80 and at 79, 110 respectively in sample mixture and compared to the spiked mixture of impurities standard.

The proposed method is specific, linear, accurate and precise. The calibration curves show good linearity over the concentration range of 1.5 to 4.0μg/mL for MMS and EMS. The correlation coefficient obtained is >0.999 in each case. Method has very low limit of detection (LOD) and quantification (LOQ). LOD of MMS and EMS are as low as ~0.5 μg/mL LOQ is of ~1.5 μg/mL respectively. Method has accuracy of 96.8 and 95.4 for both the analytes. This method is a good quality control tool for quantification of MMS and EMS impurities at very low levels in active pharmaceutical ingredients of Stribild® tablets.

Keywords: Stribild®, Genotoxic, LC-MS, Alkyl Methane Sulfonates.

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CANCER NANOTHERANOSTICS: A NEW PARADIGM OF SIMULTANEOUS DIAGNOSIS AND THERAPY

DR.A.K.M.PAWAR, P.SUSHMA

Abstract: Despite improvements in understanding of cancer and the emerging concept of personalized medicine for the treatment of this disease, is still one of the leading cause of deaths worldwide. Many tumors are still challenging to treat and novel strategies are required to effectively combat this deadly disease. Nanotheranostics is a burgeoning field in recent years, which makes use of “nanotechnology” for diagnostics and therapy of different diseases. The theranostic nanomedicine can achieve systemic circulation, evade host defenses and deliver the diagnostic agent and drug at the targeted site to diagnose and treat the disease at cellular and molecular level.

Theranostic nanomedicine can work better than other theranostics since they have advanced capabilities in an all-in-one single platform, which include sustained/controlled release, targeted delivery, higher transport efficiency by endocytosis, stimulus responsive agent release (i.e., smart delivery), synergistic performance (e.g. combination therapy, siRNA co-delivery), multimodality diagnosis and/or therapies and quality performances (e.g., oral delivery, escape from multi drug resistance (MDR) protein, autophagy inhibition etc). The encapsulation of single diagnostic or therapeutic agent in nanomedicine may not have high efficacy/specificity/sensitivity for the applications. Therefore, multimodality nanotheranostics can be developed to make use of the advantages, which may be achieved by co-encapsulation of multiple diagnostic modes and therapeutic modes in targeting nanomedicine platforms. Interestingly, siRNA can also be included in theranostic nanomedicine as inhibitor of theranostic resistance. The siRNA based theranostic nanomedicine has shown to have greatly improved the diagnosis and therapy as multimodality therapy. As a novel approach, nanomedicine has also been developed for oral chemotherapy.

This holds a great potential to be explored as a multifunctional platform for a wide range of biological and engineering applications such as molecular sensors for disease diagnosis, therapeutic agents for the treatment of diseases, and a vehicle for delivering therapeutics and imaging agents for theranostic applications in cells and living animals. Thus the implementation of nanotheranostics in cancer therapy helps to further eradicate the after effects of the chemotherapy and radiation which are main treatment risk factors associated with the cancers and also non destruction of the surrounding noncarcinoma cells of tumour.

Keywords: Nanotheranostics, Chemotherapy, Carcinoma, Therapeutic Agents.

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DOCTOR-PATIENT RELATIONSHIP: ETHICAL REFLECTIONS

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Abstract: Relationships play vital rules in the life of all living being, especially human beings. In any country the role of a doctor is considered to be the next one to God almighty. The physicians and surgeons in any country are playing vital roles in developing a healthier community. The doctor becomes an inevitable person if there is another person with a small or major illness. The relationship between the doctor and the sick person (patient) paves way for psychological, physical and emotional wellbeing. Hence in the previous era there was the “Paternalistic” attitude of the doctor. Then there was a change as “Consumeristic” attitude. At present the doctor and patient are considered to be in the equal levels. Hence the concept of “Informed Constant” has evolved. The first country to implement is UK and then it even followed by others.

In our country (India) the changing scenario is observed because of the mushrooming of private clinics. Thus patient get their autonomous in the selecting their own required mode of treatment. In our country I wish to implement “Clinical Ethics Consultation Committees” when I become a physician in future as followed by developed nations.

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HUMANITIES
MOVING THAILAND’S AGRICULTURE INDUSTRY TO THE NEXT COMPETITIVE LEVEL THROUGH INTERNET OF THINGS (IOTS)

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Abstract: The Internet-of-things (IoT), or alternatively known as the Internet of Everything (IoE), or the Industrial Internet, is a new technology paradigm envisioned as another wave of enabling technologies and business approaches that would revolutionize the world businesses, productions and services. At this juncture, the body of literature still lacks of a framework that can provide guidance to the policy-makers and the investors, at both national, and company-levels, for generating competitive advantages. Thailand and its agricultural industry are the focus of this research. To fill the gaps, three research objectives are raised, (1) to suggest a systems framework capable to illuminate how IoT investments in the agricultural industry can lead to competitive advantage at national level, (2) to develop a generic business model configuration that can provide an explicitly understandable base for the investors and owners to comprehend and form the logics of how to actually benefit from the IoT investment, and (3) to draw some implications and suggest significant propositions to illuminate some important hindering and enabling factors that influence the investments of IoTs in agricultural industry. Case study approach and purposively sampling are used for the data collection, which targeted the Thailand IoT Association and a smart hydroponic farm located in Chiang Rai. The research results also in a generic business model canvas (BMC) that could provide to the agricultural industry an intellectual base for IoT investments.

Keywords: Internet of Things, Thailand, Agriculture, Business Model, Porter Diamond, Theory of Planned Behavior.

Introduction: The Agriculture sector has a pivotal role in Thai economy, which is generally recognized in the Public as a key source of export-earning and rural income in Thailand (Suphanna chart and Warr, 2010), contributing to an approximate GDP of 9%. Nevertheless, the fast disappearance of land surplus for agriculture development (Siamwalla, 1996) and the problem of cost-price squeeze in the 1980s-1990s, with a declining agricultural workforce and increasing water scarcity, continued to push the % GDP contribution to Thai economies on downward trend, as shown in Figure 1. As such, it motivated the Thai industry and government, in the early 2000s, to make some structural adjustments, in the hope to improve the competitive advantages of the industry, which included facilitating farmers to exploit the more liberal trading environment, supporting commercial farmers, investing on genetic improvement and postharvest technology, mechanization and resource management, incentivizing contract farming companies, agribusiness firms and exporters who were willing to take risks and to readily respond to price signals (Poapongsakorn and Anuchitworawong, 2019). Government assisted through policy supports, such as by means of public research in the areas of genetic improvement and postharvest technology, and biotechnology, and improvement of production means to stimulate the production of safe and high-value food, and towards land-intensive but less water-intensive cropping patterns, promoting professionalism in farming, and with social supports.

![Figure 1: Continuing Downward Trend of GDP Contribution from Agriculture Industry in Thailand](image_url)
With the flattening growth rate of the Thai population, as shown in Figure 2, it is strategically necessary to put forward an agricultural revolution to move towards a sustainable development avenue for smart agriculture. As Kumar and Sharma (2018) presented, the advent of intelligent techniques has changed the landscape of conventional agriculture tactics, which demands policy evaluation of various relevant schemes offered by the government.

A recent trend towards accomplishing a sustainable agricultural industry development is by use of the Internet of Things (IoTs), partly propelled by the accelerated reliance on social media, Internet, and the obvious trend towards the roles played by big data and intensive use of analytics (Pham and Stack, 2017), and many countries have already started to address them as national policy. Nevertheless, the policy structure and the pattern of the emphasis in the policy towards IoTs unclear, which prompts for the first research objective, to be discussed in the sequel.

Internet of Things (IoT) is a recent technology, which refers to the stringent connectedness between digital and physical world, known to capture numerous distinctive characteristics and advantages, such as the 3A concept (anytime, anywhere, and any media), and things having identities and virtual personalities operating in smart spaces (implying uniquely addressable) (Ray, 2016). Figure 4 is a typical layer configuration of IoT, which shows the value-adding functions that interconnect and integrate the physical layers, through the communication, service, and application layers. For instance, through cropping system modeling, made possible by intelligent software programming, a diversity of smart-data based applications can be made possible, such as on weather (environmental modification), management (i.e. planting, harvesting, irrigation, fertilizer application, residue placement, tillage), soil-
plant-atmosphere (soil temperature, evapotranspiration), soil (soil dynamics, soil water, soil N, soil P, etc.), and plant modules (Jones et al. 2017).

The fast-trending of the incorporation of IoTs, big data, AI (Artificial Intelligence), and intelligent data analytics, will, according to Porter and Heppelmann (2014, p. 66), eventually, force firms to reevaluate their business assumptions: “Smart, connected products raise a new set of strategic choices related to how value is created and captured, how the prodigious amount of new (and sensitive) data they generate is utilized and managed, how relationships with traditional business partners such as channels are redefined, and what role companies should play as industry boundaries are expanded.” (Also referred to Pham and Stack, 2017, p. 131).

Scholars have highlighted that to enhance the competitiveness of a nation’s industry and performance, an industry must be situated within a conducive environment that is supportive of the business (cf. Porter, 1980). Although IoT (Internet of Things) is a relatively new emergent technology, to make IoT popularly used in the industry, and nationwide, it can be inferred that an industry’s environment that captures the characteristics of competitive advantages at national level should be actively promoted, made possible and be supported by the government. IoTs are important technological inventions and components in realizing Industry 4.0, which are used to meet the demands for horizontal, vertical and end-to-end digital integration (Telukdarie, Buhulaiga, Bag, Gupta, and Luo, 2018). In particular, IoTs are capable to update the production and operations services in the context of Industry 4.0 to an intelligent level, by taking advantages of advanced information and manufacturing technologies to achieve flexible, smart, and reconfigurable manufacturing processes in order to address a dynamic and global market” (Zhong, Xu, Klotz, and Newman, 2017, p. 616). To be specific, based on the inter-networking world which offers advanced networked connectivity of physical objects, systems, and services (p. 619), and data that carry rich information and knowledge (p. 626), the typical production resources can be converted into smart manufacturing objects (SMOs) that are able to sense, interconnect, and interact with each other to automatically and adaptively carry out manufacturing logics (p. 618).

Due to the recent accelerated development of Internet-enabled technologies and systems of businesses exploiting Internet platform, it has resulted in a growing attention of researchers focusing on IoTs. To facilitate the decision-making of owners and investors in IoTs and their enabled business model design and implementation, it requires them to reasonably understand the logics and utilities behind the investment, and form a level of confidence.

The three research objectives provide an intellectual structure to guide organizations invest and deploy IoT policies and identify clear organizational goals. The three research objectives are given below:

1. Suggest a systems framework capable to illuminate how IoT investments in the agricultural industry can lead to competitive advantage at national level, and thus, as an implication, the systems
characteristics and strengths can lead to a favorable industry-level and market-level environment conducive for IoT investment.

2. Develop a generic business model configuration, which provides an explicitly understandable base for the investors and owners to comprehend and form the logics of how to actually benefit from IoT investments. In other words, the business model configuration should provide an insight into the integrative functions of IoTs and thus to draw the attention on key activities for success.

3. Draw some implications and suggest significant propositions to illuminate some important hindering and enabling factors that influence the investments of IoTs in agricultural industry, which structures the derivations based on the business model framework and the competitiveness systems.

The linkage between objective 1 and objective 2 can be rationalized in numerous ways. Objective 1 can serve as an opportunistic environment, of reduced or controllable risk, which provides an atmosphere of stimulation and confidence for the businesses. The second objective, which serves to facilitate the perceived usefulness of IoTs or technologies, can provide a structural guideline to help the businesses evaluate the fit between opportunities and business models up-front in a systematic way since “business model innovation is too important to be left to random chance and guesswork” (Christensen, Bartman, and Van Bever, 2016). The third objective can serve numerous functions, such as pointing out the areas of strategic potentials (Pricop, 2012), and as a preliminary examination of the stress factors affecting BM components, which Haaker et al. (2017) suggest using a concept of “Heat Map” of the following color coding:

- Red – The outcome on the stress factor, which makes a BM component no longer feasible.
- Orange – The outcome on the stress factor, which makes a BM component no longer viable.
- Green – The outcome on the stress factor, which affects the feasibility or viability of the BM component, but not in a negative way (p. 18).

Literature Review: A number of theories in the field and discipline of strategic management (SM) can be exploited to assist research scholars and practitioners derive understanding and conceptualize implementation design of IoTs, for instance, in the agricultural industry.

Based on IoTs’ capability on networked and seamless inter-connectivity and smart communication, its use can help leverage the stakeholder theory to a new level. That is, when rooted in solid knowledge, the IoT investment can help the firms provide a cybernetic platform to develop mutually trusting relationships with their stakeholders that will have a competitive advantage over firms that do not (Kull, Mena, and Korschun, 2016). To be exact, the stakeholders are both internal and external in the business ecosystems, including the fact that the business model components, i.e., the tangible and intangible resources (Pera, Occhiocupo, and Clarke, 2016), should also be treated as the stakeholders. The similar premise is found in the actor-network theory, which Laasch (2018) explains that in actor-network theory, “the list of who or what can be an actor is open ended, including human beings, machines, animals, nature, ideas, and organizations,” (p. 4), which “an actor can literally be anything provided it is granted to be the source of action” (Latour, 1996, p. 373). In addition, by treating IoT resources as networked assets and capabilities, it can help the firm to flexibly and intelligently control and use their resources, that transcends given weather and operating environment – that is, IoTs enable a seamless conversation being established among the devices, systems of activities, and the environment, to make intelligent decision-making.

Being flexible and intelligent in the embedded IoTs, the technologies can pull stakeholders together to co-create values, and thus, another relevant theory is owed to the service-dominant (SD) logic of value creation (Meynhard, Chandler, and Strathoff, 2016). As advocated in Vargo and Lusch (2008), the activities and processes enabled by IoTs should be catalyzed by a service concept that emphasizes on offering a solution to a problem, and an application of competences for the benefits of others. To be specific, the SD logic of value creation should maximize the knowledge, skills, and competences of each of the stakeholders and their resources (Vargo and Lusch, 2016), for the benefits of the collective systems of businesses, and the industry.
Another important theory is owed to Michael Porter, who is widely recognized in the academic circles as one of the most influential academicians that shaped the thinking of a generation of academics and managers (Dobbs, 2014). In particular, a theory that studies how companies position within the structure of the industry is highlighted, known as the industry-based view (Garrido, Gomez, Maicas, and Orcos, 2014). The industry-based view underlies on a logic that an industry’s structure can be known by studying the five forces, which are considered as the threats posed by competitive rivalry, powerful buyers, powerful suppliers, potential new entrants and substitutes, and the collective strength of these forces, ultimately, determine the ultimate profit potential of the industry (Porter, 1980). On a creative front, Kim and Mauborgne (2005) advocate a strategic move by exploiting simultaneous value creation and cost strategies in making a major market-creating business offering.

In evolution, the practices of the Industry 4.0 would be widely recognized as the rules of the game in the industry (Williamson, 1998). The institution-based view of strategy advocates on these industrial rules and practices as the key factors that condition strategic choices (Garrido et al. 2014).

**Business Model:** Although the literature involving the studies of business model (BM) are still heterogeneous and fragmented (Biloslavo, Bagnoli, and Edgar, 2018), Osterwalder’s (2004) business model canvas (BMC) is popularly cited in the extant literature. The business model canvas presents a structure of variables that integrates and explains the logics of competition, which serves to help the managers, the investors and owners make sense of doing business (Blank, 2013). Through an explicit configuration, BMC allows management to visualize, test, and fine-tune strategic decisions, and guide the implementation process (Biloslavo, Bagnoli and Edgar, 2018).

Whether explicitly recognized or not, Teece (2010) states that every company working in a competitive market has a business model (BM) that describes how the business creates, delivers and distributes, and captures values, for its stakeholders (Haaker, Bouman, Jansen, and de Reuver, 2017). Most publications on BM involve the domains of innovation and technology management (Chesbrough, 2007), and not specifically towards IoTs. For the papers with IoT focus, they tend to focus on treating IoTs with emerging outlook and a particular attention on the value creation and value capture aspects of the resources, such as values as newness, performance, customization, “getting the job done,” cost reduction, accessibility, convenience and usability, possibility for updates, design, risk reduction, comfort and brand/status, and price (Metallo, Agrifoglio, Schiavone, and Mueller, 2018). Nevertheless, BM conception for IoTs lack of the support of empirical data and some very fundamental knowledge of cybernetic physical systems (CPS).

**Methods:** The agricultural industry is targeted, as it makes an important contribution to the economies and competitiveness of Thailand as a nation. Case study method is used, which serves as particularly effective in research issue that is contemporary in nature, and could involve drilling into why, what and how types of questions (Tan, 2019). To enhance validity, the case method is supported by triangulated sources of evidences, i.e. systematic interviewing, focus-group observations, and public and private archival document reviews.

The sampling technique is purposive. The data collection took place in 2018 and focused on seeking the views and experiences of the President of Thailand IoT Association and owner of a smart-hydroponic farm towards their experiences in the use and promotion of IoTs in agricultural productions and businesses. While the former shares the experiences to benefit the industries at national level, the latter illustrates a single-case experience that sheds light on the utilities and benefits at a company level, and illuminates a partial picture of the proposed generic business model.

While interviewing the IoT Association President, a smart mushroom farm designed and implemented by the IoT Association President was introduced to the researcher, as shown in Figure 5.
A humidity-control aspect of the mushroom control system is illustrated schematically in Figure 6, which reiterates the role of “sound engineering knowledge” in the IoT smart farming investments, as also repeatedly reinforced in the second case with a smart agriculture farm in Chiang Rai, as shown in Figure 7.

To help the Thai government and the industries push forward the national IoT agenda, The IoT Association has established five strategic pillars of working groups, namely (1) technology development working group, i.e. the agricultural technology working group, as shown in Figure 8, (2) advanced business model promotion working group, (3) IoT security working group, (4) data flow working group, and (5) international cooperation working group.
The working group pillars of the IoT Association share the integrative Framework structure of Porter’s Diamond that the ultimate purpose is to cultivate and nurture the strengths of national industry and the market activeness in order to acquire a national competitive advantage position, as shown in Figure 9.

In particular, the “advanced business model promotion” working group exploits a guiding principle that aims to build the confidence level of the investors, business owners and managers, which in a way shares the theoretical logics of the Theory of Planned Behaviors (Ajzen, 1991), by making use, also, of the theory of technology diffusion that maximizes the integrative functions of observability, trialability, compatibility, simplicity and relative advantage elements as advocated in Rogers (1995), and market externality effect, as shown in Figure 10.
Findings: The findings are presented in addressing each of the research objective raised in the Introduction section.

Objective 1: Suggest a systems framework capable to illuminate how IoT investments in the agricultural industry can lead to competitive advantage at national level, and thus, as an implication, the systems characteristics and strengths can lead to a favorable industry-level and market-level environment conducive for IoT investment.

To address the objective 1, we triangulate by (1) the available 110-nation data on Global Innovation Index, Global Competitiveness Index, Corruption Perceptions Index, World Digital Competitiveness Index, and Logistics-Performance Index, (2) the documentary study of policy-relating voices of the Thai government and some supporting offices, and private sectors of significant weights, and (3) the in-depth interview with the IoT Association President, and working-group observations.

Based on the recent updates of the 110-nation data, it shows that 89.8 per cent of the variance of global competitiveness index of a nation can be explained by the combined world digital competitiveness index and logistics performance index, which are representatives of both the digital and physical connectivity and competencies, as shown in Figure 11. In addition, governmental role and the innovation strategies of a nation are also significantly important in influencing the development of both digital and physical logistics infrastructures and capabilities. Together, Porter’s Diamond structure of variables contributing towards national competitive advantages is revealed as a feasible, preferred systems framework to illuminate how IoT investments in the agricultural industry can lead to competitive advantage at national level.

Specifically, both the documentary data analysis and an in-depth interview with the IoT Association President provide an evidence that their voices do reflect a structure of variables as advocated in Porter’s Diamond framework of national competitive advantage, as shown in Figure 12. To realize Thailand as a “hub of IoT”, the different stakeholders in the documentary analysis share a common understanding. That is, Thailand needs to boost up the demands at many different market domains: at the domestic level (diversity of domestic industries, and local communities), at neighboring countries (ASEAN markets), and world markets. The Digital Economy Promotion Agency (DEPA), being established in 2017 with 280 million Baht budget and an ad-hoc Baht 1.5 billion budget, aims to drive the digital economy under Thailand’s 4.0 strategic plan. To succeed, DEPA stresses policies that also reflect the systemic integration of the Porter’s Diamond elements: “DEPA proposes digital HRs and talents, and technological competencies such as AI, cloud computing, and multi-disciplinary and mechatronics engineering,” as key elements in stimulating the factor condition.
“Actively promote new startup and new S-curves industries, focusing on innovation, scalability, and repeatability, with a need to enlarge the startups and advance them to mature stages, with particular emphasis on diversified industries in the country” (Strategy, DEPA).

Figure 12: National Competitive Advantage Induced Structure of Factors

The following captures some of the voices expressed by the IoT Association President relating to the different elements illuminated in Porter’s Diamond Model: “Without business activities pursuing IoTs in scales and scopes, it would be difficult to create large-scale awareness nationwide. A shared common interest and motivation is very important” (Strategy, Market Condition)

“The IoT market should deliver clear benefits or values of IoT, i.e. cost reduction, operational equipment uptime, and availability improvement, operations speed increase, product quality improvement and safety” (Market, value-driven Strategy)

The market condition should stress on the entrepreneurial segments, as they play significant pull factor: “The entrepreneurial segments, including innovative retail sectors, are constantly in search of higher value-added products, such as fruits as herbal products, the cosmetics, chemical extract, rice varieties, and they have the ability to pull the upstream stakeholders to participate in IoTs” (Market Condition)

“Both the physical and the digital worlds must be integrated in the design and implementation, as the digital world does not have the resources as the physical world. The digital world, by its nature, has to use the resources of the physical world, as shown in the Grab taxi and shared motorbikes concepts.” (Strategy)

“Where should Thailand focus in IoT investment. An example is to look at the IoT value chain. A typical IoT configuration is picturized by smart objects and smart devices at the field level, followed by connectivity and communication layer, and then, software customization and applications at the customer level. Typically, there is 5-10% of value at the smart-device level, but is dominated by China, with already around 80% of the smart-device market. The smart-objects share the similar scenario, at 15-20% of the value in the value chain. The 20-40% of the connectivity businesses are dominated by AIS, DTAC and TRUE companies in Thailand, which require big investments, and make it infeasible areas for IoT investments. The feasible areas are the software customization, at 15-20% of value, and the applications another 10-20% of the total value of the IoT value chain.” (Strategy direction).

“IoT integrates both the physical objects and digital technologies, turning each physical object into smart object, that is capable of sensing and making intelligent decisions, based on programable logics and deep learning, AI corrections” (Strategy)

“Market sustainability of new concept, that exploits IoTs or some emergent technological and business model concept, as illustrated in the shared motorbikes in China and elsewhere, has to stand on an
ability on system-wide organization of physical resources, and the responsible attitude of consumers” (Factor and Market Conditions)

“Farmers often show phobia with technology and computers. They do get excited with the drone flying around their farms trying to collect data and providing the irrigation and chemical spraying services. However, farmers hesitate to engage with the computerized gadgets.” (Factor condition)

“While the world population continues to grow, the agricultural workforces in both the developed and developing nations continue to show a downward trend. To alleviate the workforce shortages in the agricultural sectors, the IoT investment is a viable plan, by shifting to advanced technology” (Factor condition).

Technological trend and various governmental policies show “the chance” is there for IoT investments. “There is a closed ‘plant factory’ concept, for agricultures, which can offer safer and higher valued products, i.e. of higher vitamins and minerals, and use less spaces.” (Chance)

The supporting role of Government has, also, to support the IoT investments. This is obvious from the documentary evidences.

A number of socio-psychological factors and concerns are also evidenced: “Our working groups work under a 3M principle, namely developing a Model to serve as a Motivator for the investors and business owners to invest on Money, …, and someone must take on a ‘Leadership’ role to establish the Model, so that others can emulate” (IoT Association, reflecting the Theory of Planned Behavior in the working).

“Depending on budget and operator’s concern, the IoT investment could be arranged on gradual basis, in order to build confidence and establish the competencies step by step: We can start with localized automation, at machine level, and proceed to automation in a production line, and gradually be extended to factory wide, and beyond the production boundary, using a smart-logistics concept.” (IoT Association)

“Without security and privacy standardization in place, and in support by the national Laws, the widespread usage of IoT would be very limited” (IoT Association)

“Sustainable commitment and efforts on shared things and systems could be hindered by human beings, being self-centered, with neglectful attitude towards shared responsibilities such as on devices and systems. If this could be resolved, we could, probably and easily, implement shared economy concept. IoT is suitable for realizing shared economy, as everything is connected on digital platform.” (IoT Association)

**Objective 2:** Develop a generic business model configuration, which provides an explicitly understandable base for the investors and owners to comprehend and form the logics of how to actually benefit from IoT investments. In other words, the business model configuration should provide an insight into the integrative functions of IoTs and thus to draw the attention on key activities for success.

The business model concept is used to depict a logic of competition (Tan, 2018). Osterwalder and Pigneur (2009)’s business model canvas (BMC) is currently the most frequently used approach in presenting the business model concept of a firm, and its simplicity, as depicted in the nine-block canvas configuration, presents a shared language for describing, visualizing, assessing and adjusting the business strategies.

The interviews with Thailand IoT Association President and owner of a smart-hydrophobic farm in Chiang Rai reveal a generic BMC as shown in Figure 13. The IoT business model should be solution-centric, and able to leverage networked resource capability, smart devices and smart interconnectivity,
in order to innovate the activities on the various domains of BMC, such as the activities that can contribute to the planning, management and control of the supply chain (Accorsi et al. 2017). The business model should serve not only the operations of the businesses, in smart agricultural farms and their enterprises, but from the view of Thailand IoT Association, should also serve a “developmental” function, i.e. by making use of “Partnership” to instill nation-side motivations.

With IoTs, farmers can present to their wholesale or retail customers, and the markets, with a quality-consistency image and reputation, in cost-efficient manner, and thus, are more capable to fight against the competition in the markets and the industry, and equip the farmers with the ability to provide a consistent service that the traditional farmers (those without IoTs) are not easily able to deliver: “By transforming my hydroponic farm into IoT system, it allows me to position myself as a supplier of consistent ability to supply to the volume and quality requirements. As such, I can maintain my selling price, while others have to face the price fluctuations in the market.” (The smart-hydroponic farm case).

The fresh vegetable supply system in the market is not a straightforward business, and I have seen businesses enter and exit continuously. During the Winter, the production goes smoothly, and suppliers can generally meet the market i.e. the wholesale / retailer expectations. In hot seasons, production goes down, along with diseases, quality issue and defects, which demotivate the suppliers, and cause exits. The IoT allows me to have the first-hand knowledge of the farms and their health in real-time basis, and the system adjusts itself automatically to maintain the quality expected.” (The smart-hydroponic farm case).

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</tr>
<tr>
<td></td>
<td>IoT enabled</td>
<td>Safety and security</td>
<td></td>
<td>Internet of Business</td>
</tr>
<tr>
<td></td>
<td>IoT enabled</td>
<td>Engineering knowledge driven</td>
<td></td>
<td>Internet of Business</td>
</tr>
<tr>
<td></td>
<td>IoT enabled</td>
<td>Programming – Obsidian control system</td>
<td></td>
<td>Internet of Business</td>
</tr>
<tr>
<td></td>
<td>IoT enabled</td>
<td>Information richness of the business</td>
<td></td>
<td>Internet of Business</td>
</tr>
<tr>
<td></td>
<td>IoT enabled</td>
<td>Cost advantages and differentiation</td>
<td></td>
<td>Internet of Business</td>
</tr>
</tbody>
</table>

Figure 13: The Generic Business Model – for Thai Agriculture Industry

**Objective 3:** Draw some implications and suggest significant propositions to illuminate some important hindering and enabling factors that influence the investments of IoTs in agricultural industry, which structures the derivations based on the business model framework and the competitiveness systems.

The interviews with Thailand IoT Association President and owner of a smart-hydrophobic farm in Chiang Rai reveal a generic BMC as shown in Figure 13, which also yield numerous important propositions stated below: “IoT as networked resources and resource-efficiency leveraging machines”.

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The term, IoT, illuminates broadly an “extension of network connectivity and computing capability to objects, devices, sensors, and items not ordinarily considered to be computers” (Boyes et al. 2018, p. 3). With the IoTs, the resources become networked resources, which have a spectrum of analytical and intelligence capabilities (Kane et al. 2015), and thus, the entire BMC elements are the domains of the IoT-induced functions. This proposition virtualizes the supply chain and can help organizations suggest the best ways to improve productivity and solve customer problems, and thus, can significantly improve the planning, orchestration and coordination of members of the supply chain in cost-efficient manner (Verdouw et al. 2013).

“Resources should simultaneously target on cyber-, social and physical spaces” by exploiting the cyber-physical computing (i.e. situation awareness, context-aware computing, data fusion and data mining), social computing (i.e. collective intelligence, recommendation system, crowdsourcing), and thinking computing (i.e. affective computing, brain informative) (Ning et al. 2016, p. 511) capabilities.

“IoT value proposition should rely on and make plan based on cybernetic-physical systems (CPS) principle.” CPS is defined in Boyes et al. (2018) as “a system comprising a set of interacting physical and digital components, which may be centralized or distributed, that provides a combination of sensing, control, computation and networking functions to influence outcomes in the real world through physical processes”, adapting the version of Boyes (2017).

Hindering areas could lie in both livelihood-purpose segment and large-scale segment. The former is a segment which is smaller in scale and whatever the agriculture focus it is livelihood-important. This segment has low propensity towards technology employment, because of cost-burden, and the intermediary buying that tends to push downward the selling price from the farmers. The latter is large-scale operator segment, having own markets, with stability, and have some sufficient capability to resist pressures from the environment. The large-scale companies tend to source IoT designs from international suppliers, and have the capability to replicate with a low-cost version that would benefit them competitively in the markets.

“The smaller-sized segments in the agricultural sectors, generally, do not have the investment power as well as the market power. They have insufficient funds to make large-scale investment, coupled with low-return due to smaller scale. We suggest a “sharing” strategy, which can make use of integrating a group of small farmers, to share on IoT systems investment. Some challenges do exist, such as in how to convince the farmers on shared economy.” (IoT Association).

Sound engineering knowledge of farming production is considered a crucial ingredient for success in the IoT systems design and implementation, as voiced from both the cases.

“Without sound engineering knowledge, it is quite impossible to succeed in, for instance, an IoT-integrated plant-factory investment, such as a closed mushroom-plant factory.” (IoT Association)

What is considered “valuable and rare” from the perspective of suppliers may not be similarly shared by the customers. For instance, the second informant, of the owner of a smart-hydroponic farm in Chiang Rai, highlights an aspect of a restraining force, as follows:

“Although IoT is a rare technology, considered of tremendous value, but our customers not really value, as they see the value from the product, that is, the hydroponic vegetables we deliver to them.” (Hydroponic farm case)

**Discussion and Conclusion:** This research provides a cross-sectional view of the current IoT market and industry in Thailand, as guided by the three research objectives in which the emerged themes and propositions identified are conceptually bounded and facilitated by Porter’s Diamond Model framework and the business model canvas (BMC) concepts.

A fundamental goal of this research is to provide the information and inferred knowledge to the industries, in general, to help them understand the IoT-enabled business environment and learn of a
The generic configuration of IoT-enabled business model, which they can exploit. Osterwalder’s business model canvas (BMC) configuration is selected as the basis for the summary of the qualitative data analysis, due to its simplicity and intuitive exhibit of the interrelations among the model’s components (Rusu, 2016).

The three research objectives not only match the trilogy of strategy, which consists of context (Porter’s diamond model), concept (i.e. for technology diffusion, based on theory of planned behavior, and national competitiveness atmosphere), and conduct (business model), but they can also be reckoned to underpin on three purposive perspectives, namely (1) descriptive (supported and based on empirical data), (2) normative (guided by Porter’s diamond framework and business model canvas ontology), and (3) instrumental view that establishes a connection between the business model and systems of efforts and the attainment of a firm’s performance and industry’s competitiveness.

The research also helps the research scholars to form an expanded understanding to some of the recognized theories commonly used in the discipline of strategic management. One important theory is the stakeholder theory, which the business model components should also be treated as the stakeholders, and in addition, the IoT invested should enable the firm to develop mutually trusting relationships with its stakeholders, leading to a competitive advantage over firms that do not yet implement IoTs through networked connectivity capability.

The seamless connectivity and smart communication of smart devices and sensors, through AI programmable logics and systems, and actuators eventually for the foundation to realize the so-called “business ecosystems”, leading to shared competitive advantages.

When the business model is actively mastered, the case informants indicate that one will gain the competences to replicate them, and thus, provide an avenue for production and market expansions. In sum, to serve to develop IoT investments at national level, this suggests shed light on a number of areas which the policy-makers can pursue:

- An industrial environment showing national strength towards competitive advantage.
- A big picture in IoT investments manifested in the IoT-enabled business model, with CPS-centered value propositions that can push forward the virtualization of supply chains and business ecosystem, and is leveraged through networked resources, capabilities and activities that exploit IoTs.
- Resolving some of the restraining or hindering socio-psychological factors that relate to the motivation and confidence levels of potential investors, owners and managers.
- The activities of the business model should underpin on digital ecosystem concept and the shared economy principle, and is solution-driven.

Acknowledgement: This research is funded by the Center of Technology Innovation and Entrepreneurship Research at National Tsing Hua University, Hsinchu City, Taiwan, and Feng Chia University, Taichung, Taiwan, which is made possible through a collaboration with the School of Management, Mae Fah Luang University (MFU), Thailand.

References:


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THE PERCEPTION OF BRAND PERSONALITY IN HOTEL AS A BRANDING

DR. WORAKAMOL WISETSRI

Abstract: Nowadays, the tourism-related businesses are very important to the Thai economy. The hotel business is one of the service businesses that are directly related to the tourism sector. The important thing that can be used as a business strategy is "Branding" which is something that can create products that are different from competitors so brand consists of six elements: 1) the appearance of the product / service (attribute) that can be recognized 2) the benefit of the product (3) the value of the product (value) that makes sense that used to be proud 4) culture (brand) of brands that want consumers to recognize 5) the personality of the product (Personality) that is used to create personality according to the product (Brand Personality) and 6) users (User) is a product that can tell the main target group (Philip Kotler, 2003). This study explores how customers of the perception of brand personality in hotel as a branding perceive and react to their products and services and thus can use the finding to suggest a structured consumer-oriented strategy for perception of brand personality. The studies the roles played by hotel benefits and consumer decision-making styles. By "specific", this research focuses on both marketing and branding factors. Samples were drawn conveniently from customers who have had perception of brand personality. The qualitative is used for the multivariate statistical analysis.

Keywords: Perception, Service Quality, Customer Behaviors.

Introduction: The tourism-related businesses are very important to the Thai’s economy. The hotel business is one of the service businesses that are directly related to the tourism sector. The hotel business is a hotel business as accommodation which has been classified as Thai Standard Industrial Classification (TSIC) which means arranging accommodation for rent on a daily basis therefore weekly who are short-stay Including guest rooms and suites that are fully furnished and may include other services such as food and beverage services, parking, laundry, swimming pool and gym. The facilities and meeting rooms, etc. so the hotel business has expanded to 18.7 percent in accordance with the improved adaptation of the tourism sector in the second quarter of 2015 Therefore, hotel operators will have to face competition at Intensify Therefore it is necessary to adjust the business strategy in order to support the increasing competition.

The important thing that can be used as a business strategy is "Branding" which is something that can create products that are different from competitors so brand consists of six elements: 1) the appearance of the product / service (attribute) that can be recognized 2) the benefit of the product (3) the value of the product (value) that makes sense that used to be proud 4) culture (brand) of brands that want consumers to recognize 5) the personality of the product (Personality) that is used to create personality according to the product (Brand Personality) and 6) users (User) is a product that can tell the main target group (Philip Kotler, 2003) by Jason Demers (2013) has said that creating "brand good products "must be unique that makes a difference and stand out above the competitors to attract customers.

Moreover, to create a unique identity for a hotel brand is to use a marketing tool called "Personality" then Personality (Brand Personality)" which connects human personality with the brand by inferring basic behavior Psychological personality traits attitude and belief Including demographic characteristics both directly and indirectly (Aaker, 1997). Branding is an important thing that leads to customer satisfaction and can be an intermediary to link value (Value) and identity (Uniqueness) Some additions to the functional functions of that service in recognition of the quality and value of customer service (iHotel Marketer, 2016)

Therefore positive awareness of service quality is another factor that has become a strategy that can create sustainable success for the hotel business. If the customer evaluates the perception of service quality with positive emotions, it will lead to the decision to purchase the service (Parasuraman, Zeithaml & Berry, 1990) moreover the customers also have an assessment of the services are worth the total amount of money that the customer has to spend. If the customer perceives the value of the service
it is considered a successful business because of the perceived value of the service of that customer. It is important to make the purchase intention then customer buying decisions and brand loyalty.

Moreover, the power of word of mouth communication as the perception of brand personality in hotel as a branding so the power of word of mouth (Word of Mouth Communication) can be considered is very important to stability and the survival of the hotel business because it refers to the behavioral intentions that the customer speaks of good experiences received and expressed by introducing families, friends, colleagues and other people to use the service. which, if brought together to tell each other, that means those customers will have the opportunity to re-use the service again and therefore can be regarded as maintaining the existing customer base and increase new customers base effectively.

However, although many foreign researchers have studied about the personality, brand and service quality recognition of hotel businesses, such as Tran, Dauchez & Szemik (2013) In Thailand, the study of the influence of brand personality and service quality perception of recognition of service value or even the word of mouth communication of the hotel business is still very small, so the researcher is interested in studying these issues as a guideline for determining the marketing strategy for the hotel business in Thailand. The word-of-mouth communication or telling others a story is currently playing a key role in the stability and survival of hotel business as this mode of communication reflects behavioral intentions of customers talking about their good experience about a particular business service and also through their recommendation for family, friends, colleagues or others to use such a service. This information, when retold from person to person, is likely to make these customers to use the services again. In other words, this is an efficient way to maintain the existing customer base and extend the new one (Nuananong Phanad, 2015).

One of the key issues that can be utilized as a business strategy and a factor leading to word-of-mouth communication in business hotel is “building a unique brand” which distinguishes a product or service from its competitors in order to attract customers (Jason Demers, 2013). Further, one of the methods to attain this uniqueness of hotel brand is to make use of a marketing tool called “brand personality”, or a concept associating human personality traits with a brand (Aaker, 1997). This research attempts to examine the influence of brand personality on word-of-mouth communication so as to the perception of brand personality in hotel as a branding.

**Literature Review:** Aaker (1997) explained that Brand personality refers to linking the group of human personality traits to the brand. By inferring basic behavior psychological personality traits attitude and belief and demographic characteristics both in a direct manner by connecting people and brands such as user image which is the creation of human characteristics to be associated with that type of brand user and indirectly through properties related to the products. The product catalog brand name symbol or logo advertising model, price and distribution channel

Plummer (1984) explained that the personality of the brand represents a brand identity through various forms of communication around the consumer which consumers will interpret and associate ideas and the feeling and image of the brand from all things learned from the Plummer (1984) has divided the personality of the brand into 2 parts: the personality brand, the brand identity, which is a tool that has important for determining the creative advertising strategy’s a personality that marketers define for communication for consumers to know the brand and brand personality profiles which are perceptions of consumers and the brand is an idea and consumer feelings the marketer must try to make the image that the consumer perceives as close to the personality as possible. Thus, the key factors influencing the word-of-mouth communication of the hotel business in the differentiate age (Goods and Services) is the service that will be used as a topic in conversation or birth. Stream of viral marketing is a service that promotes the creation of customer perceptions and the service or brand must be unique and unique and may be done by using the personality, branding in branding to be different from other brands in the same service category which the use of personality, brand, is useful for creating branding is strong and can increase the understanding of consumer perceptions and attitudes towards the hotel brand. It can also create good recognition that leads to satisfaction and the use of consumer services. If consumers
have a good feeling towards the brand, it will likely lead to further information of other consumers who are close to each other, resulting in word-of-mouth communication by creating through service brands. Therefore Brands (Brands) which are important to the image and reliability of the service. The characteristics of that brand can be both name (Name), term (symbol), symbol, graphic design.

**Research Method:** The present research is a study of the relationship between perception of brand personality independent variables which are five dimensions of brand personality and a dependent variable which is using Multiple Regression Analysis in analyzing this set of relationship.

**Research Sample:** The research sample was 415 undergraduate students in Khon Kaen University. Most of them were women = 78.9% with the average age of 24.

**Measurement Tools:** The 5 biggest hotels in Khon Kaen was selected for the research case. It is a well-known hotel in Khon Kaen province where the study was conducted. The measurement tools consisted of three parts: Part 1 contained 42 questions of brand personality (Aaker, 1997) which employed a 5-point Likert scale (5=most likely; and 1=not at all); Part 2 asked three questions of word-of-mouth communications which employed a 5-point Likert scale (5= Strongly Agree; and 1= Strongly Disagree); and Part 3 contains questions about personal data of research participants.

**Results:**

Table 1: Descriptive Statistics and Reliabilities

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sincerity</td>
<td>3.10</td>
<td>.59</td>
<td>.83</td>
</tr>
<tr>
<td>Excitement</td>
<td>3.95</td>
<td>.66</td>
<td>.82</td>
</tr>
<tr>
<td>Competence</td>
<td>4.03</td>
<td>.63</td>
<td>.85</td>
</tr>
<tr>
<td>Sophistication</td>
<td>4.20</td>
<td>.59</td>
<td>.82</td>
</tr>
<tr>
<td>Ruggedness</td>
<td>2.60</td>
<td>.86</td>
<td>.88</td>
</tr>
<tr>
<td>The perception of brand</td>
<td>3.78</td>
<td>.68</td>
<td>.83</td>
</tr>
</tbody>
</table>

The reliability of the research tool was tested; results of which are shown in Table 1. The value of Cronbach's Alpha ranged between .80 and .89, which was over .70, suggesting that the measuring tool of this research was reliable (Nunnally, 1959).

Table 2: Multiple Regression Results

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>The perception of brand</th>
<th>β</th>
<th>t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sincerity</td>
<td>1.5</td>
<td>1.95</td>
<td></td>
</tr>
<tr>
<td>Competence</td>
<td>.38</td>
<td>4.71*</td>
<td></td>
</tr>
<tr>
<td>Sophistication</td>
<td>.08</td>
<td>.94</td>
<td></td>
</tr>
<tr>
<td>Ruggedness</td>
<td>.02</td>
<td>.98</td>
<td></td>
</tr>
</tbody>
</table>

* P<.05

As seen in Table 2, there were only one personality dimension: competence(β = .38, t=4.71, P<.05) which affected the perception of brand. Meanwhile, Sincerity(β = .15, t=1.95, P>.05), excitement (β = .16, t=1.91, P>.05), Sophistication (β = .08, t=.94, P>.05) and ruggedness (β = .02, t=.98, P>.05) did not affect the perception of brand.

**Summary, Discussion, Research Applications, Limitations and Recommendations:**

**Summary:** Results found that only one brand personality dimensions, sincerity influences the perception of brand. The influence of brand personality on perception of brand found that personality,
brand, and influence perception of brand and the personality of the brand that influences perception of brand is personality with ability with regression coefficients equal to .35 and with the value Sig. = .00 which is less than .05, therefore rejecting the main hypothesis (H0) and accepting the secondary hypothesis (H1).

It can be concluded that the personality, brand, ability, can be used to predict perception of brand with statistical significance at .05 level.

This model has the R2 decision coefficient equal to .28, which has a low level of value, meaning that it is the personality of the five brands, namely, sincere, capable, elegant, level or complex and strong together. Forecasting perception of brand for 28 percent. Therefore, the regression equation is as follows.

\[ Y = .99 + .12X1 + .15X2 + .35 X3 +.07 X4 + .03 X5 \]

Therefore, perception of brand = .99 + .12 (sincere personality) +.15 (exciting personality) +.35 (capable) +.07 (elegant, sophisticated or sophisticated) +.03 (Strong)

**Discussion and Research Implications:** This research was showed the influence of the perception of the personality of the brand as a hotels as word of mouth is very useful. The results of this research concern to apply marketing strategies and also found of customers to recognize the unique identity of the hotel as a branding strategy to use words of mouth strategy, thus, this research known as word-of-mouth communication is the one of power to communicate with customers to knowing as a brandings and also the perceptions of personality can be created by starting with the selection of talented and diligent employees (hard-working) come to work, offering the best service to customers. Moreover the service must be exactly as presented to the customers. Therefore, the services are offered to customers must be accurate. Thurs, the appropriate and consistent (Parasuraman, Zeithaml & Berry, 1998), such as the room service that is exactly what the customer has booked and should establish a relationships with customers through various social media such as Facebook Twitter or promoting customers who are satisfied with the services of the hotel as a branding on the service according to various websites because most customers tend to like read the opinions of customers who have experience with those services before (review) for use in making a purchase decisions and the hotel should have office security CCTV systems and emergency evacuation routes. This is to create the customers to be aware of reliable, secures, and successfully (successful) in the long run business. Therefore, the hotel that should be have new technology or services that stand out above the competitions, such as having a large conference rooms and a modern sounds and lighting systems that can accommodate a large number of people or have a mall areas and the large hotels located within walking distance to allow customers to purchase products which is to create the customers to be aware of being a leaders, intelligent (intelligent), confident in himself, and having the special expertise (technical) of the hotel that is superior to the competitors, which will help reflect the leadership in the hotel industry as a brandings.

**Recommendations for Future Research:** This research examines only the relationship between the influences of the perception of the personality of the brand hotel benefits and consumer decision-making styles. For future research should have education the relationship between perceived service quality perceived service value or brand loyalty of the hotels with word-of-mouth communications because these 3 factors is very important to the hotel business.

**References:**


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IMPACT OF JOB STRESS AND TURNOVER INTENTIONS ON EMPLOYEE ABSENTEEISM WITH REFERENCE TO FABRICATION INDUSTRY

DR.S.SUDHA

Abstract: Purpose of this study is to analyses the causes of employee absenteeism. Job stress and turnover intentions are the two independent variables and employee absenteeism is the dependable variable taken for the study. For this purpose employees in fabrication industry were taken for the study. A questionnaire with Likert Scale (1: Strongly Disagree to 5: Strongly agree) was designed for data collection. 200 questionnaire were distributed out of which 190 questionnaire were received. The response rate was 95%. The first part of the questionnaire comprised of gender, age, income, level of management and marital status of employees. Factor analysis and Simple regression were used in the study to examine the impact of job stress and turnover intentions in SPSS 21. The results and findings of the analysis confirm that job stress and turnover intentions do contribute for employee absenteeism. Future research should take more variables for the above study. The innovative and contribution to research is that there are few national and international reviews found in fabrication industry. Hence this study would contribute to review of literature.

Keywords: Job Stress, Employee Turnover Intentions And Employee Absenteeism.

Introduction: Human resources have become an integral part of every organization. They play a vital role in every activity of organization. But they face lot of challenges in every aspect of work they are involved in to. Among such challenges are one is job stress and the second challenge is the turnover intentions or withdrawal intentions from the job. It is important to identify the origin of the term job stress. According to Walter Cannon and Hans Selye defines job stress as scientific phenomena arises because of external environment. Job stress arises because of influence of external stimuli and its evaluation. It generally leads to negative outcomes like ill health, tension and behavioural strain outcomes. Job stress has its first origin from medicine where it arose because of cognitive dissatisfaction. Based on engineering version it arises on stimulus based review. Thirdly it also arose from organizational psychology, job stressors arises when there is no control on workers. From fourth perspective point view which is cognitive psychology job stress is related to person, environment and judgement relationship.

As it is already highlighted job stress attracts negative outcomes, one such outcome can be employee turnover intentions. It means withdrawal intentions in an employee which can lead to permanent withdrawal from the organization. The turnover intentions can be temporary or permanent. These intentions can turn into reality, based on the attitude and behaviour of the employee. They would ponder with their feelings and thoughts before taking a decision of quitting from the job. The Concept of Turnover Intention reveals the attitude of an employee. These thoughts are very complex in nature. Intentions can be defined as statement of specific interest of behaviour of people. According to psychology there is a significant and positive relationship between turnover intention and actual turnover. Employees undergo mentally 3 important stages before they quit their job. First they develop an intention of leaving the organization. Secondly they look out for similar jobs outside and thirdly based on the result of the second stage they actually quit their job or it might just remain as an intention to quit.

As a result of two negative challenges existing in organization it results in negative outcomes like absenteeism from work or restraining oneself from work. Reviews on absenteeism highlights that it can be defined as 1-3 months, 4to 12 months and greater than 12 months. Employees absenting themselves from the job, for a shorter period of time, like 1 to 3 months the reasons are unclear, but when they start restraining from job for a longer period of time, the main reason is negative job attitudes. Employee absenteeism increases organizational costs and decreases the over all performance of the organization. This concept has not much received attention in the field of research. Hence the 3 important challenges existing in organizations have been taken for the study.
Review of Literature: Jex and Beehr, (1991) defines job stress as the outcome of job roles and work in organizations. Leka et al. (2003) further highlights mankind is always affected by psychological and work force pressure which are the causes of stress in the job. Situations in job demands generally lead to job stress in organizations. There are several reasons for job stress in work place. Arnold and Feldman (1986) points out a working condition in organizations leads to stress. Walonick (1993) in his research study has analysed that external factors do create stress for employees in organizations. Job stress is in different forms and ways and hence it affects the employees. But the result of job stress always has negative outcomes.

On the other hand employee turnover intentions are also another factor which has negative outcomes. This negative outcome happens because organizations never recognise the efforts taken by employees. Rebelo & Gomes, (2011) in their research study brings to notice that poor performance appraisal systems in organizations are the causes for employee turnover intentions. Another reason for employee turnover intention is the job insecurity among employees. It is harmful in nature and provides its effect on performance and leading to work absenteeism. A research done among 183 workers on turnover intentions job stress was also another reason for turnover intentions and withdrawal behaviour.

Absenteeism from work is a conscious decision taken by workers, and they are very commonly found among labourers. Due to personal matters, constraints, family obligations they never attend the work. Neubauer (1992) has identified absenteeism arises because of high stress levels. Aaron Cohen (2007) highlights through his research study that job stress is a strong predictor of absenteeism. Nathan et.al (2007) also highlights job attitudes and stress are indeed very challenging enough to be handled. It is important for HR managers in organizations to predict absenteeism among employees. Even demographic variables do have an impact on employee absenteeism. In a study conducted by Aaron Cohen (2006) have revealed that demographic variables, no strong commitment in organizations are the reasons for absenteeism.

Statement of the Problem: Organizations all over the industry have been facing lot of challenges. Indian fabrication industry is one among them. 40 million people are working in this industry throughout the world. It occupies 14% of the Indian workforce. There are several problems the industry has been facing through. Employee absenteeism is one among them. It has been a recurring feature in many countries including India. In India the rate of absenteeism is quite high when compared to Western countries. It is important to systematically look and probe into this problem and find out the reasons for absenteeism.

Need for the Study: For this reason as per review of literature, two factors were identified job stress and employee turnover intention for the research study. These factors have been the major cause for absenteeism in international fabrication industry. But in India these factors has been given lesser concentration. Hence in order find whether these factors do contribute for absenteeism a perception analysis has been conducted among employees in this industry.

Objectives of the Study:
1. To identify the employees perceptions on factors (job stress, turnover intentions) on employee absenteeism.
2. To examine the association of job stress, turnover intentions on employee absenteeism.

Hypothesis for the study
1. The factors of employee absenteeism do not differ significantly.
2. There is no association between job stress, turnover intentions on employee absenteeism.

Research Methodology:
Tool: Structured Questionnaire was used for the study.
**Sampling:** Employees belonging to fabrication industry in Chennai were chosen for the study. Convenience sampling were chosen for the study. 200 questionnaires was distributed out of which 190 respondents participated in the study. The response rate for the study was 95%.

**Statistical Tools and Analysis:** SPSS 20 was used for the study. Factor analysis and Simple regression was used for the study.

**Conceptualization:** The Job Demands–Resources (JD-R) model is the theory taken for the study. It highlights that job demands and resources are a part of organization process. Even though they are not negative in nature, they might turn to be job stressors where high efforts are required to achieve the job targets from which the employee cannot be recovered.

The theory of organization equilibrium is the first theory connected to turnover intention. It weighs employee perception in contributing to the organization. If it is negative in nature then no contribution is made by the employee. Social exchange theory main perspective is the consequence of non-respect of agreed rules by management or co-workers.

**Model for the Study:**

![Diagram]

- **Dependent variable:** employee absenteeism.
- **Independent variables:** Job stress and Employee turnover intentions.

**Data Analysis:**

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
<th>Change Statistics</th>
<th>df1</th>
<th>df2</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>0.7904</td>
<td>0.624</td>
<td>0.6207</td>
<td>1.710038</td>
<td>0.624733</td>
<td>155.6559</td>
<td>2</td>
<td>187</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), totemployeeturnover, totjobstress

The R square value is .624 which means that about 62.4% variations in the dependant variable ie employee absenteeism is jointly explained by independent variables job stress and employee turnover intentions.
Table 2: Showing ANOVA\(^b\)

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
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<td>155.656</td>
<td>.000</td>
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<tr>
<td>Residual</td>
<td>546.831</td>
<td>187</td>
<td>2.924</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1457.179</td>
<td>189</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), totempLOYEE turnover, totjob stress  
b. Dependent Variable: totempLOYEE absenteeism

The above table shows that F value is 155.656 and the alpha level shows .000 which is smaller than the p value .05 which proves to be statistically significant relationship. Hence the calculated values confirms that both the independent variables job stress and employee turnover intentions have a significant impact on employee absenteeism.

Table 3: Showing Coefficients\(^a\)

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>-16.290</td>
<td>2.169</td>
<td>-7.509</td>
</tr>
<tr>
<td></td>
<td>totempLOYEE jobstress</td>
<td>.792</td>
<td>.098</td>
<td>.547</td>
</tr>
<tr>
<td></td>
<td>totempLOYEE turnover</td>
<td>.735</td>
<td>.045</td>
<td>1.115</td>
</tr>
</tbody>
</table>

a. Dependent Variable: totempLOYEE absenteeism

From the above table it is inferred that job stress contributes a lot and it is the main reason and impact for employee absenteeism. The second variable which has the most impact is the employee turnover intentions.

**Conclusion:** It is important that organizations treats its employees as its valuable resource. On the other hand they should also concentrate on retaining employees at work for their continued production process. Hence it is suggested that organization following retaining strategies in order to reduce employee absenteeism.

**References:**


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INFLUENCE OF ARTIFICIAL INTELLIGENCE ON CUSTOMER RELATIONSHIP MANAGEMENT IN E-COMMERCE INDUSTRY

DR.S.VASANTHA

Abstract: The Indian e-commerce industry has been recorded remarkable growth in the last decade. It is expected to become the second largest e-commerce market in the world by 2034. With the availability of internet facilities and emergence of smart phones in India, the growth of ecommerce is projected to grow 829 million at the end of the year 2021. The Customer relationship Management plays a vital role for the success of e-commerce over traditional business in various segments. The implementation of successful CRM requires adoption of latest technology. The integration of latest technology of Artificial Intelligence contributes to the growth of ecommerce Industry by acquiring new ones and retaining the old ones.

Objective: In the present scenario, the tremendous development of technology has more impact on our daily lives. The latest development of Artificial intelligence has dominated in the entire world. Artificial intelligence refers to intelligence exposed by machine. It refers to the simulation of the human intelligence processes. AI happens when a robot is able to understand a set of rules which are called an algorithm to make decisions. This paper attempts to review literature and examine the present scenario of integration of AI in ecommerce industry towards CRM implementation

Methodology: The case studies of Amazon, JD.com, Alibaba, eBay, ASOS, Rakuten, Flipkart are discussed to understand Artificial intelligence for the implementation CRM in e-commerce Industry

Findings: A Business Insider articles forecasts in the year 2020 that nearly 85% of customer interactions will be without a human. Ubisend report states that 40% of visitors on an e-commerce site utilize AI chatbots to identify offers and deals and further it highlighted that 1 in 5 customers is willing to buy from a chatbot. The research report based on survey shows that worldwide retail e-commerce sales grew to $ 2842 Billion last year from $ 1336 Billion in 2014 and it is expected to cross $ 4878 Billion in 2021.

Keywords: Artificial Intelligence, Customer Relationship Management, Ecommerce, Technology.

Artificial Intelligence: Kok defines artificial intelligence as a branch of computer science which deals with human-like thought processes. It can include operations like gaining knowledge, reasoning and rectification of the decisions taken by the systems. It is designed to extend the capabilities of computer systems.

Jahanzaib Shabbir, and Tarique Anwer (2015) defines Artificial Intelligence (AI) is the property of machines, computer programs and systems to perform the knowledgeable and innovative functions of a person, independently find ways to solve problems, be able to draw conclusions and make decisions. Most artificial intelligence systems have the ability to learn, which allows people to improve their performance over time.

Customer Relationship Management and AI: Customer relationship management has witnessed massive developments and rapid changes for the past few years. With the latest development of Artificial Intelligence (AI) technologies, customer interactions have become more interactive and more sophisticated (Van Doorn et al. 2017). Bradlow et al. (2017) have highlighted the use of big data to increase target customers and accordingly optimize pricing with help of predictive analysis. Organization can predict customer features based on behavior in social media (Culotta, et al. 2015), (Syam & Sharma 2018)

Gaskell (2016) has emphasized that AI would aid as a tool for increasing current relationship management technologies and methods and it should not be considered as a replacement or substitution for human interaction. It is an instrument to assess not only impersonal interaction but also some machine learning technologies are able to access and recognize human emotions (Brynjolfsson & McAfee (2017). Electronic customer relationship management offers an opportunity for interactions between a business, its customers and its employees through Web-based technologies. The process
combines software, hardware, processes and management’s commitments geared toward supporting enterprise-wide CRM business strategies. (Berry, 1983; Gronroos, 1990) and succeeding Customer Relationship Marketing (CRM) frameworks suggest that the CRM can be divided into a sequence of phases consistent to the relationship life-cycle (Dwyer et al, 1987) attract, retain and enhance.

The artificial intelligence companies are specialized in algorithms, deep learning and machine learning to assist e-commerce industry for implementing customer relationship management. It is projected that 85% of the customer interactions in e-commerce industry will be handled without the intervention of a human by as soon as 2020. The integration of AI, deep learning and its applied fields such as Machine Learning, have a profound impact on different phases of customer AI provides a means to enable informed and intelligent responses across all these platforms.

Application of AI:
1. Serve customized advertisements tailor-made to customer behavior patterns
2. Chat-bots to offer deal with pre-sales and POS queries in real-time
3. The Application of artificial intelligence enables to provide customized POS suggestions depends on Purchase patterns of alike customers as well as purchase record
4. The recommendation and reviews of customers are used to attract the purchasers.
5. Based on the cart-abandonment data, automated mail is sent to convert the customers by applying Artificial Intelligence
6. Application of predictive analytics is able to target market, maximize engagement and optimize channel strategies Retain/Maintain
7. Attending real time post-sale enquiries
8. Automated servicing to deal with post-sale enquiries based on customers need
9. Intelligent, tailored content marketing
10. Programmatic advertising to deliver ads tailored to the customers’
11. Automated email –deliver relevant, personalized messages and content directly to selected customers
12. Use of predicted analytics to reach customers or to maximize Customer life time value (CLV)

Artificial Intelligence in E-Commerce: Case Studies:

Amazon: In Amazon, with the support of algorithms it helps to guess the product needed by customers and also provide customized suggestions based on customer exploration. Machine learning technology is used by the product commendation team to develop its product forecasts, and those perceptions are shared all over the company. AI and machine learning drives three popular Amazon products: Alexa, the Amazon Go Store, and the Amazon recommendation engine. According to Rejoiner, 35 percentage of sales would result due to recommendation engine. The cashier-less Amazon Go store also takes benefit of the plethora of data to track customer shopping trends. Data from customers’ smartphone cameras tracks shopping activities and not only helps Amazon Go, but it is also be shared with the machine learning team for continued development. These three divisions of Amazon AI work together collaboratively to enrich the customer’s experience with Amazon.

JD.com: Beijing-based JD.com use robotics technology, to increase warehouse processes. The purpose was to enhance the rapidity and effectiveness of product categorization and delivery in warehouses, eliminating costs and growing revenue. It aims to provide seamless experience of online shopping to the customer. As a result of this initiative, the number of orders doubled and nearly 85% of the orders were delivered within 2 days time. The founder, and CEO of JD.com, specified that AI is a essential element of the company’s business strategy to take the business forward. The integration of Artificial intelligence assists to reduce the number of employees also to increase efficiency, by decreasing manual work which ultimately results profit margin.

Alibaba: The integration of Artificial intelligence in CRM is more powerful in Alibaba to achieve competitive edge. It facilitates customer service chatbot, responding to customer inquiries, both written and spoken ones, and it is very powerful now. The use of AI algorithms supports to motivate internal
and customer service processes comprising smart product and search suggestions. It also uses AI to assist and plan the most effective delivery routes. Alibaba stated that smart logistics have ensued in a 10 percent decline in vehicle use and a 30% fall in travel distances.

**eBay:** eBay sees AI as strategy to retain consumer interest and advantage over its competitors. The eBay Shopbot helps the user to search and find the products they need using NLP. The customers can strike a conversation 24/7 with the chatbot system available on eBay. The chatbot system gives a feeling of being connected to the customer and the customer feel that they are being attended to at any point of time during the day. The chatbot takes text, voice or pictures taken by the customers as input, thus facilitating them to the maximum extent possible. Machine Learning is also playing a vital role in the business strategy.

**ASOS:** Fashion retailer ASOS have invested in AI and voice recognition system to understand the factors that influence buyer behaviour. The visual search ability matches the images of the outfits uploaded by the customer and matches them with the similar outfits that are being sold online. Thus, it helps the user by providing suggestions according to their pulse.

**Rakuten:** Rakuten is the Japan’s e-commerce site. It has invested in AI to forecast customer behaviours. Prediction of customer behaviour is extremely essential for the survival of the organization. They are able to examine 200 million products to predict sales with a high amount of accurateness. With the help of Rakuten Fits Me app, they are able to improve customer satisfaction and productivity of sales by using image recognition technology.

**Conclusion:** The application of artificial intelligence in e-commerce is lot. E-commerce firms continuously improve their AI tools to better map market demand. Currently e-commerce companies namely Alibaba, Rakuten, eBay, and Amazon are applying AI for detection of fake reviews, chatbots, product suggestions, handling big data, etc. Artificial intelligence gives lot of opportunities to change our lives in online business world.

**References:**


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EFFECTIVENESS OF EMPLOYEE WELFARE MEASURES TOWARDS RETAINING EMPLOYEES WITH SPECIFIC REFERENCE TO IT INDUSTRY AT CHENNAI, INDIA

R. NISHA

Abstract: Employee Welfare comprise the well-being and enhancement of employees and which includes both monetary and non-monetary benefits. Employee welfare involves the endeavors of employer which are concentrating en route for employees with definite amenities and services in addition to their salaries. The main objective of the research to afford better working environment and to relive personnel from job lassitude and to improve intellectual and substantial environments of living of employees. The exact logic behind for giving welfare schemes is to create efficient, healthy, loyal and satisfied work force for the organization. The main motto of providing such facilities were to create Quality of Work Life and retain employees for the betterment and also to improve their standard of living.

The research design which is adopted is Descriptive Research. Primary data required for the research is to be collected through questionnaire by collecting the response from the employees of IT industry. In this research, Convenience sampling is used (some time known as grab, accidental or opportunity sampling), it’s a type of non-probability sampling which involves the sample being taken from the part of the population which is accessible. Hence a population which are selected is readily available and convenient. The sample size is 110 respondents from IT Industry. SPSS statistical tool is used to analyze the data analysis. The recommendation and Suggestions is provided through this research to the IT Industry which supports the organization to provide a sophisticated working environment and Professional well-being of employees. Hence, with full contentment, to conclude that the research taken for this specific topic could be fulfilling, satisfying and comprehensive both from the perspective of academic and professional motives.

Keywords: Employee Welfare, Satisfied Work Force, Sophisticated Working Environment, Professional Motives, Academic Motives.

I. Introduction: Employee welfare entails all those activities of employer which are directed towards providing the employees with certain facilities and services in addition to wages or salaries. According to N.M. Joshi, Welfare work covers all the efforts which employers make for the benefit of their employees over and above the minimum standards of lively working condition fixed by the factories Act and above the provisions of the social legislation providing against accident, old age, employment and sickness. Organizations provide welfare facilities to their employees to keep their motivation levels high. The employee welfare schemes can be classified into two categories viz. statutory and non-statutory welfare schemes. The statutory schemes are those schemes that are compulsory to provide by an organization as compliance to the laws governing employee health and safety. These include provisions provided in industrial acts like Factories Act 1948, Dock Workers Act (safety, health and welfare) 1986, Mines Act 1962. The non-statutory schemes differ from organization to organization and from industry to industry.

Need of the Study: The specific need for the research in this title is to identify the legal and statutory benefits that are provided in IT organizations. This research ascertains whether the employee’s welfare measures improves employee productivity and effectiveness to assess employee satisfaction towards retaining employees.

Scope of the Study: The study on employee’s welfare measures in “IT organizations has through light to the welfare measures of employees in the organization. To find out the practical difficulties involved in welfare measures that can be evaluated through this study. The study can be used to bring out the solution for the problem faced by the employees availing the welfare measures. The study covers the IT organizations is taken into consideration and the survey is conduct among the employees through the questionnaire. The scope is to undertake a survey based on questions related to employee welfare and the responses are recorded.
Objectives of the Study:
Effectiveness of Employee Welfare Measures towards Retaining Employees in IT Industry:
- To analyze the efforts taken by the organization to support their employees by identifying and satisfying the needs.
- To examine the employee satisfaction towards the welfare measures provided by the organization.
- To analyze and suggest further improvement of existing welfare facilities in the organization for the betterment of employees.
- To study the employee welfare facilities provided to the employees of IT organizations.

Statement of the Problem: Employee welfare measures are an effort towards relieving the industrial workers from want, worry and the adverse effects of industrialization, by improving working and living conditions. The proper administration and implementation of Employee welfare facilities plays a vital role in fulfilling the economic, social, and psychological needs of employees. In satisfying these needs a favorable attitude towards the job could be developed. Job satisfaction is an attitude, which is the result of many likes and dislikes experienced while working in an organization. The provision of employee welfare facilities is one of the factors instrumental in promoting job satisfaction. They need to encourage their employees to perform better and to improve efficiency and retain efficient employees. For this purpose, providing adequate Employee welfare facilities and promoting job satisfaction assumes importance. Further the study will verify whether the statutory or the non-statutory Employee welfare facilities are a better predictor of job satisfaction and retaining employees.

II. Literature Review:
Hangarki revealed that relationship between employee satisfaction level and welfare measures in selected nation bank in Karnataka region. It is clear that welfare facilitated employment by bank are not equally satisfactory to all employees. Most of the employees are dissatisfied with the clarity and transparency in communication, training and development, food court, rest rooms, are most important in those amenities, because employees felt inconvenient to have their lunch in front of the customers.
Sultan Nazia and Bushra Begum highlighted in the article that MNCs in India are making strategic movements in keeping their talented personnel. This learn attempted to fill the gaps by way of analyzing the impact of three R’s i.e. respect, recognition and rewards on fulfillment level of individual and by analyzing numerous participants adopted by way of Indian MNCs in retaining their employees. Maximum of the employees dealing with process in their organization is quite inefficient.
Srinivas K.T highlighted that the moffering good facilities to all the employees in such manner that employee emerges as glad about labor welfare facilities. It increases productivity in addition to quality and quantity. Enhancing the welfare facility through the personnel will become happy, employee performance degree emerge as increase, it leads to improve positive effects of profitability and product of the enterprise.
Dr. Usha Tiwari, stated that as consistent with the examine average suggest score and percent rating of the overall employee satisfied with the facilities. The workers welfare facilities provided by the enterprise to employees are satisfied, but still scope of there for further improvement so that performance, effectiveness and productiveness may be improved to accomplish the organization goal.

III. Research Methodology:
Need of Research: Extension of knowledge to light information that might never be discovered during the ordinary course of life. Establish generalizations and general laws which contributes to theory building. Verify and test the existing facts and theories, initiate, formulate, and analyze interrelationships between variables and to derive causal explanations and to find solutions to the problems.
Research Design: The research design adopted in the study is descriptive research. It includes survey and fact enquires of different kinds. The major purpose of descriptive research is descriptive of state of affairs, as it exists at present. In social science and business research we quite use the term exposit fact to research for descriptive research studies.
Data Collection Methods:

Types of Data Collection:
- Primary data
- Secondary data

Primary data required for the study was collected through the questionnaire by collecting the response from the employees of IT organizations in and around of Chennai.

Sampling Techniques: In this study the sampling technique is used as Convenience sampling (some time known as grab, accidental or opportunity sampling), it is a type of non-probability sampling.

Sample Size: The research undertaken into consideration has a sample size of 110

Sampling Unit: The respondents from IT employees in Chennai.

Pilot Study: Once the questionnaire was developed, a small pilot survey was being taken in to consideration so as to remove the unwanted questions and add those questions that were earlier missed. The pilot survey was being done with sample size of 50. A reliability test was conducted to know the reliability outcome of the questionnaire and attained a test result of .919

<table>
<thead>
<tr>
<th>Reliability Test</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cronbach’s Alpha</td>
<td>0.919</td>
</tr>
<tr>
<td>N of Items</td>
<td>45</td>
</tr>
</tbody>
</table>

Statistical Tools Used: The statistical tool used in this project are as stated below:
- Percentage Analysis
- Chi-square test
- Correlation Analysis
- Weighted average

Limitations of the Study: The research was undertaken only within the Chennai region and the area of study is limited. Hence there could be few anomalies. Some of the limitations are given below
1. Sample Size – Due to region constraint the survey was restricted to 110 respondents from the universe
2. Employee’s responses may be biased.
3. Time constraints – Due to lack of time, the respondents were in a hurry to fill up the questionnaire. And hence, it may be difficult to ascertain the responses provided were actual.

IV. Data Analysis & Interpretation:
Table No: 1: Creates Efficiency Towards Work

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highly dissatisfied</td>
<td>20</td>
<td>18.2</td>
</tr>
<tr>
<td>Dissatisfied</td>
<td>22</td>
<td>20.0</td>
</tr>
<tr>
<td>Neutral</td>
<td>16</td>
<td>14.5</td>
</tr>
<tr>
<td>Satisfied</td>
<td>22</td>
<td>20.0</td>
</tr>
<tr>
<td>Highly satisfied</td>
<td>30</td>
<td>27.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>110</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>
Interpretation
From the above table and chart inferred that 18.2% of respondents are highly dissatisfied and 20% of the respondents are dissatisfied 14.5% of the respondents are neutral 20% of the respondents are satisfied 27.3% of the respondents are highly satisfied with the creates efficiency towards work of employee welfare measures.

Chi Square Test:
AIM: To find out whether there is association between gender of the respondents and know about quality of food.

Chi-Square Tests:

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Value</th>
<th>Df</th>
<th>Asymp. Sig. (2sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>.946(^a)</td>
<td>4</td>
<td>.918</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>.951</td>
<td>4</td>
<td>.917</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>.167</td>
<td>1</td>
<td>.683</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>110</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^a\) o cells (.0%) have expected count less than 5. The minimum expected count is 7.85.

Interpretation: Since P value (.918) which is greater than 0.05, the null hypothesis is accepted. Hence it is concluded that there is no association between gender of the respondents and know about quality of food

Correlation Test:
AIM: To Find out if there is any relationship between aspects that affect that various facilities and medical facilities.

Correlations:

<table>
<thead>
<tr>
<th>Table 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>medical</td>
</tr>
<tr>
<td>Pearson Correlation</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
</tr>
<tr>
<td>N</td>
</tr>
</tbody>
</table>
**Interpretation:** Since the R value (.078) is in positive, it is understood that the relationship between the aspects that affect the various facilities and medical facilities of the organizations. Thus, null hypothesis (H0) is accepted.

**One Way ANOVA Test:**
**AIM:** To test whether significant difference between for long have you been working in this organization of the respondents with factors consider as a suitably offered benefit packages.

**ANOVA**

<table>
<thead>
<tr>
<th>Sum of Squares (df)</th>
<th>Mean Square</th>
<th>F (Sig.)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Between Groups</strong></td>
<td>1.428 (4)</td>
<td>.357 (.293)</td>
</tr>
<tr>
<td><strong>Within Groups</strong></td>
<td>128.027 (105)</td>
<td>1.219</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>129.455 (109)</td>
<td></td>
</tr>
</tbody>
</table>

**Interpretation:**
P value = 0.882
Since P value greater than 0.05, accept H0.
There is no significant difference between for how long have you been working in this organization of the respondents with factors consider as a suitably offered benefit packages.

**ANOVA**

<table>
<thead>
<tr>
<th>Sum of Squares (df)</th>
<th>Mean Square</th>
<th>F (Sig.)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Between Groups</strong></td>
<td>6.044 (4)</td>
<td>1.511 (1.286)</td>
</tr>
<tr>
<td><strong>Within Groups</strong></td>
<td>123.411 (105)</td>
<td>1.175</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>129.455 (109)</td>
<td></td>
</tr>
</tbody>
</table>

**Interpretation:**
P value = 0.280
Since P value greater than 0.05, accept H0.
There is no significant difference between for how long have you been working in this organization of the respondents with factors consider as a suitable salary increment based on performance.

To test whether significant difference between for working in this organization of the respondents with factors consider as a provident fund and settlement.

**Null hypothesis (H0):** There is no significant difference between for how long have you been working in this organization of the respondents with factors consider as a provident fund and settlement.

**Alternate hypothesis (H1):** There is significant difference between for how long have you been working in this organization of the respondents with factors consider as a provident fund and settlement.
Weighted Average:

Table 6: Satisfaction towards Various Facilities Provided by the Organisation

<table>
<thead>
<tr>
<th>Facilities</th>
<th>Highly dissatisfied</th>
<th>Dissatisfied</th>
<th>Neutral</th>
<th>Satisfied</th>
<th>Highly satisfied</th>
<th>Weight</th>
<th>Sample</th>
<th>Weighted</th>
</tr>
</thead>
<tbody>
<tr>
<td>medical</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>Total</td>
<td>350</td>
<td>110</td>
</tr>
<tr>
<td>educational</td>
<td>19</td>
<td>21</td>
<td>20</td>
<td>20</td>
<td>30</td>
<td>351</td>
<td>110</td>
<td>3.19</td>
</tr>
<tr>
<td>canteen</td>
<td>19</td>
<td>22</td>
<td>20</td>
<td>20</td>
<td>29</td>
<td>348</td>
<td>110</td>
<td>3.16</td>
</tr>
<tr>
<td>housing</td>
<td>19</td>
<td>16</td>
<td>23</td>
<td>30</td>
<td>22</td>
<td>350</td>
<td>110</td>
<td>3.18</td>
</tr>
<tr>
<td>travelling</td>
<td>23</td>
<td>30</td>
<td>20</td>
<td>21</td>
<td>16</td>
<td>307</td>
<td>110</td>
<td>2.79</td>
</tr>
<tr>
<td>recreation</td>
<td>22</td>
<td>16</td>
<td>18</td>
<td>30</td>
<td>24</td>
<td>348</td>
<td>110</td>
<td>3.16</td>
</tr>
</tbody>
</table>

**Interpretation:** It was found that the weighted average for various facilities is 3.18 which show that medical facilities provided by the employers. It was found that the weighted average for various facilities is 3.19 which show that educational facilities provided by the organizations. It was found that the weighted average for various facilities is 3.16 which show that canteen facilities provided and 3.18 which show that housing facilities, 2.79 which show that travelling facilities and 3.16 which show that recreation facilities provided by the IT organizations.

**V. Findings of the Study:**
- It was found that majority of the respondents are felt that medical facilities highly satisfied with the employees.
- It was found that majority of the respondents are dissatisfied with the travelling facilities and felt that the environment is cleaned regularly.
- It was found that majority of the respondents are highly satisfied with the provident fund towards social security benefits.
- It is understood from the above table most of the respondents are felt that there is no improvement in providing welfare facilities like medical reimbursement facility to the employees.
- Most of the respondents felt there are highly satisfied with the recreation facility and 20% of the employees highly dissatisfied with the recreation facility.
- The hypothesis is that relationship between age of the respondents and satisfaction towards Work Environment is significant.

**VI. Recommendations and Suggestions:**
- Hygiene facilities and Medical facilities needs a lot of improvement.
- It is suggested that considerable attention should be paid to have first aid appliances with quality drugs and necessary medicines.
- Recreation is a leisure time activity which is a healthy diversion and a spare time occupation. It refreshes an individual mentally, lessens the monotony and drudgery of employees everyday work. The physical, social, cultural and intellectual benefits which flow to an individual worker from a proper use of leisure are all the reasons why recreational facilities should be more abundantly provided.
- The organization shall arrange more well-being programs to improve the employee's awareness about the welfare measures working conditions and social security schemes.
- The organization should improve the welfare facilities of the employees.

**VII. Conclusion:** Employee welfare is a wide area within the sub set of HRM. Welfare means different connotation to different individuals. Some may like it to economic benefits, and the others may link it to career path etc. When these welfare measures are not provided to the possible extent the employees gets
dissatisfied that leads to inefficiency and less productivity by the employees. Retaining talented personnel also becomes difficult to the organization. Hence IT organizations should take full efforts in providing welfare measures to the employees for improving their work efficiency and retaining the talented employees.

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INDIAN WOMEN EMPOWERMENT AND ITS IMPACT ON SOCIO - ECONOMIC DEVELOPMENT: AN OVERVIEW

DR. K. FLORENCE

Abstract: Indian women by far have attained many pinnacles in various dimensions of life. The transformation of women from the stereotype of a weaker sex into a prominent socio-economic force has been remarkable in its own plight. Women Empowerment is not merely gaining power over men but also comprehensively redistributing it by way of challenging male chauvinistic Indian society. Working women groups constitute a vital significance in equitable distribution and allocation of monetary resources. Furthermore, in the Indian women empowerment in economic metabolism is actually inclusive and paves way for furnishing economic and social balance in all respects. In this context, this paper intends to analyze the relationship between women empowerment and it’s role in assets creation. It also proposes to ascertain the impact on Indian society in conjuncture with economic viability and rejuvenation of livelihood for women. An insight into upliftment of the marginalized women in relation to economic development will also be discussed. This paper plans to measure the empowerment of women from the grass root level of socio-economic diversity irrespective of any gender bias. At the end, this paper will discuss the relevance of sociological theories and concepts such as Martha Nussbaum’s idea of gender issues in developing society, Nancy Julia Chodorow’s concept of the Psychoanalysis, Gender and Culture, Robert K Merton’s Latent and Manifest Functions and Pierre Bourdieu’s social capital for understanding the power of Indian women in facilitating socio-economic development in nation-building. Indian women, particularly the marginalized section have the creative potentiality in the workforce, governance and social capital and can serve as model for other developing societies in the world.

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DRAGON AND ELEPHANT: EMERGING ECONOMIES

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Abstract: Over the past 25 years China’s GDP per capita grew about 17 times and India’s GDP per capita grew about 4 or 5 times. India’s GDP is approximately $2 trillion, which is about 8% of the emerging markets’ total GDP. China’s GDP is about $8.5 trillion, or 37% of the total GDP of the emerging markets. The basket of countries that we refer to as “emerging markets” produces $23 trillion in GDP, whereas the US GDP is about $16 trillion. Whole country is in an era of global transformation, and it is quite profound. It can be described by the rise of the so-called BRICS countries (Brazil, Russia, India, China, and South Africa). South Africa is not always included. Many countries are lobbying to be included in the acronym and its members are not developed countries. Each country is unique in its capitalistic nature. But it is essential to analyze these countries as individual nations and recognize that there’s something bigger going on as well: the rise of systemically influential emerging markets and the relative decline of the United States. It is a great power transformation; it is the rise and fall of the great powers.

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EDUCATION OF WOMEN AMONG THE TRIBES OF CHITTAGONG HILL TRACTS

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Abstract: The study of education of women among the tribal groups of Chittagong Hill Tracts, a south-eastern region of present Bangladesh is significant. Considerable volume of research has been conducted on the tribes of this region, their origin, political background, their chiefs or kings, etc., but the important issue, that is, education among these tribes is neglected by the scholars. Historians who have worked on the tribes of Chittagong Hill Tracts have not paid their attention to women's education which plays a very significant role in overall development of individuals, especially for women. Research dealt with the Chittagong Hill Tracts and its tribes are silent on women's education. The tribal women being more visible in every sphere of life are less visible in the studies of the tribal societies that have been conducted so far. The researchers find difficulties with the sources as they are very scanty and scattered. In fact, the historical records of this region begin only after the arrival of the British, and the records are also not very helpful in providing information on this aspect. However, employing secondary sources, the present study has attempted to dig out the required things from the available historical sources, i.e. writings of the British administrators, accounts of foreign travellers and the contemporary history of Arakan and Tripura, etc. to showcase the education of women. Simultaneously, the researcher has used alternative sources, like folklore, oral traditions, etc. Together these sources have explained the education of women. Hopefully, the study will be helpful to the future researchers, academicians etc. and will provide a wider view on education of women among the tribes of Chittagong Hill Tracts.

Keywords: Tribes, Education, Family, Marriage, Religion, Ritual.

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AN INTERSECTIONAL APPROACH TO ADDRESSING GENDER AND REGIONALIST BIASES IN THE WORK PLACE

ANGIELA THERESE Z. GEMENIANO

Abstract: The theory of intersectionality — defined by feminist scholar Kimberly Crenshaw, refers to the complex but comprehensive concept on how various forms of discrimination like racism, classism and sexism overlap and impact people — has always been existent in almost every workplace in the Philippines but never addressed. This paper argues that discrimination against women deeply rooted in gender and regionalism can be better understood through the lens of intersectionality. Beginning in job interviews until their last few moments in the workplace, women and regionalized groups are at more risk of experiencing biases that defy the purpose of being employed. For the younger generation to be more proactive and start conversations which discuss their thoughts on intersectionality among their peers. Within the daily lives of Filipinos, underrepresentation of women, currently recognized by everyone but not addressed, should be re-imagined. This paper aims to bring together researchers, policy-makers, people in the field of human resources and the youth to discuss and explore the avenues of intersectionality and how it relates to discrimination, to educate the youth and encourage everyone to set people free from the shackles of discrimination.

This paper will employ a qualitative approach which will be a combination of descriptive and exploratory research. The researcher is planning to use a phenomenological methodology. In-depth interviews will be conducted to 12 females, aged 22-48, who are currently employed. The sample will be selected by way of convenience sampling.

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INCREMENTAL REHEARSAL MEDIA: IT'S EFFECTIVENESS IN IMPROVING THE WORD RECOGNITION SKILLS OF FRUSTRATION READERS

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Abstract: Incremental rehearsal is defined as the method of presenting unknown materials to students by pairing it with familiar materials that will provide the learners to stay in task. This strategy is said to be helpful in its enhancing the word recognition skills of the pupils. This study aimed to find out the effectiveness of incremental rehearsal media in improving the word recognition skills of the frustration readers. This study employed quasi-experimental research with a pretest-posttest design. It involved a total of ninety (90) Grade I pupils who were officially enrolled in Dole Cannery Central Elementary School at Octavio Village, Barangay Cannery Polomolok South Cotabatoduring the school year 2017-2018. These respondents were assigned in three treatments: Treatment 1 (Flash card); Treatment 2 (Chalk board) and Treatment 3 (Media) and were exposed to ten (10) special instructional plans. The level of word recognition skills of the pupils was assessed at two measurement points: pre-test and post test using the thirty (30) Dolch sight words. The data were analyzed using frequency count, weighted mean and One-way Analysis of Variance (ANOVA). The result of the study revealed that the frustration readers in different treatments have very low level of word recognition skills. After the application of the incremental rehearsal method, the level of word recognition skills of the pupils in different treatments reached very high. The analysis of variance revealed that there is a significant difference in the word recognition skills of the frustration readers in the media, flash card and chalk board treatments. This study concluded that there is a significant difference on the means of the word of recognition skills. It is recommended that the school administrators may conduct trainings and workshops for teachers regarding reading using incremental rehearsal method.

Keywords: Education, Incremental Rehearsal Method, Word Recognition Skills, Frustration Readers, Experimental Design, Philippines.

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THE WOMAN IMAGE IN THE POETRY OF FADWA TOUKAN

DR. MOHAMMED DAWABSHEH

Abstract: Fadwa Toukan is one of the famous poets in Palestine and the Arab world, for a number of reasons including the bravery that was appeared in her poetry, and her attitude towards men, religious and society. The poet suffered from many social and political conditions, and she dealt with her poems, in which she openly expressed the penance and oppression that she faced with her family. She is one of the poets who spoke about Palestinian, Arab and international women from different sides, such as:
- Fighting Image.
- Human Image.
- Leading Image.
- Political Image.

The researcher used the descriptive analytical approach to study the subject, because it is the closest approach to study such a topic.

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**A BLOODY BATTLE: THE LIFE OF A PERSON WITH SPECIAL NEEDS DEALING WITH MENSTRUATION**

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**Abstract:** The menstrual cycle is a hormonal monthly bleeding that prepares women for a possible pregnancy every month. Women, with or without a disability, are encountering this at the same time but differ in their problems and experiences and they should be given equal access to Menstrual Hygiene. Consequently, the researchers attained to answer what are the challenges being faced by the Persons with Special Needs during menstruation, how do they practice menstrual health management and how do they cope with their menstrual problems. Descriptive research design was utilized in the study, the parents of the menstruating girls with special needs in San Fernando City, La Union were the participants, the instrument that was utilized is semi-structured interview to further ask follow-up questions, convenience sampling was used in selecting the participants and the data gathered was analyzed through thematization where the responses of the participants were categorized into relevant themes. In conclusion, the challenges that the girls with disabilities experience are rejection of sanitary napkin, fear of blood, poor communication, inappropriate behavior and mood changes, and physical discomfort. Furthermore, in managing their menstrual health, the researchers identified two ways. First, the use of sanitary pads which needs guidance by their mothers or caretakers. Second, through professional assistance. Thus, in coping on their menstrual problems, they have various strategies such as through emotional support and training.

**Keywords:** Challenges, Coping Mechanisms, Menstrual Hygiene, Menstruation, Special Needs.

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RED FLAG: MENSTRUATION THROUGH THE LENS OF THE LESBIAN COMMUNITY

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Abstract: The LGBTQ+ or Lesbian, Gay, Transgender, and Queer + is a community referring to the union of individuals that are diverse with respect to their gender reference. This group revolves around the individuals whose gender identity is different from their original gender given to them at birth or simply, they do not view themselves as either masculine or feminine, but they consider themselves as part of the LGBTQ+ community that is now observed in our modern generation. Consequently, the researchers aimed to answer the challenges being faced by the lesbians towards menstruation and how do the lesbians cope up with these menstrual challenges. Lesbians who have experienced menstruation in the province of La Union with an age bracket of 18 and above years old were chosen to be the participants of this study. The study involved gathering of data through a semi-structured interview to provide opportunities to both researchers and respondents to discuss certain topics in more details. Then the data gathered were analyzed and organized into related themes. In conclusion, the researchers found out that there are definitely various challenges being faced by the lesbian community as they undergo menstruation. The findings showed that lesbians are challenged when it comes to dealing with standards and menstrual shame. On the other hand, lesbians were able to bear the challenges that they faced with their different coping mechanisms that are categorized in two themes mainly their inner-empathy and realization to overcome the aforementioned challenges.

Keywords: Menstruation, Lesbian, Menstrual Management, Challenges.

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MEN ON MENS: PERCEPTIONS ON MENSTRUATION

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Abstract: Menstruation has been surrounded by different perceptions of men that causes change to the beliefs, practices, and knowledge of people. In addition to that, menstrual stigma currently occurs in our world today and it generates negative impact in a woman's life, reduce positive health outcomes, and self-esteem. Men became a part in shaping one's attitude towards menstruation. This study explores on what do men know about menstruation, how did they gain knowledge about menstruation, and what are the personal attitudes of men towards menstruation. Furthermore, this study is in a Phenomenological Descriptive research design, where the prevailing perceptions of men and lived experiences on menstruation were asked through semi-structured interviews and come up with different themes through the process of thematization. The participants were male students of LORMA Colleges Basic Education Department ages from 12-18 years old and they were chosen by convenience sampling. The researchers found out that men perceived menstruation as a natural and painful process. It was also found that men still believe about the misconceptions on menstruation. On the other hand, some men do not have any knowledge about it. However, men’s knowledge can be influenced by different factors such as education, family, and social media. And last, men have supported women during their period and some men perceived menstruation negatively which causes menstrual stigma. To put action with this problems, the researchers came up with a program entitled "PiDOT" where infographics was posted to the different bulletin board at LORMA Colleges school campus in order to spread awareness about menstruation, the effects of negative perceptions to women and for them to eradicate the increasing number of menstrual taboo and stigma that currently exist in our world today.

Keywords: Knowledge, Menstruation, Misconception, Perceptions, Stigma.
A MOTHERLY LOVE: TEENAGE SELF-CARE DURING POST LABOR
ELLENIE CASUGA, JEAN JULLIAN FE, FREAH NICOLE NOTO, MARY JOYCE YAP

Abstract: One in ten of Filipino women who are aged 15-19 are pregnant; 8% of them are already mothers, while 2% are pregnant with their first child. These are large numbers that can affect the outcome on how children are properly developed and taken care of. Furthermore, the mother must also be given attention, as they require special needs during postpartum (the period following childbirth). These needs changed and are dynamicized due to the alien nature of pregnancy and postpartum altogether. Mothers have to cope indefinitely to the circumstances that arise during this period. This study explores the specific challenges faced by a teenage mother after their labor, the healthy measures taken by the mother after giving birth, and the ways for self-care to be improved for teenage mothers during postpartum. Furthermore, this study is a Phenomenological Descriptive design, wherein the experiences of teenage mothers are carefully dissected, while applying ethical considerations, through a semi-structured interview. The researchers found that most Filipino teenage mothers rely on third party care; this may span from friends, to family and close relatives. Moreover, the participants indicated challenges and hindrances that needed to be addressed, such as pain and discomfort, financial necessities, physical ineptitude, etc., either through external help, or self-reliance. The lack of proper education with regards to pregnancy and self-care during postpartum, either by formal education or by informal media of acquiring information, was quite prevalent in most of the participants. The extent of their knowledge was solely hinged upon the practices and guidance of their mothers, with some intervention from doctors; and none coming from formal fonts of education such as schools.

Keywords: Postpartum, Self-Care, Teenage, Pregnancy, Mothers, Filipino.

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LIVED EXPERIENCES OF ILOKANO SINGLE MOTHERS

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Abstract: Single parenthood experiences the toughest challenge life has bestowed upon an individual specifically single mothers rearing children with special needs. Single mothers of special children have worries and stresses in dealing with their situation may it be in physical and financial well-being. The researchers seek to answer the: lived experiences, challenges and coping mechanisms of Ilokano single mothers rearing children with special needs. The researchers employed a qualitative-phenomenological research with the goal of gathering various data from 6 Ilokano single mothers rearing children with special needs living in the City of San Fernando, La Union that were chosen through a snowball sampling. The participants were personal interviewed by the researchers then utilized Thematization process to obtain an optimum result for this study. Ilokano single mothers rearing children with special needs values the experiences they have encountered, hardships that made them stronger. It was stated that their stress is the greatest factors affecting their well-being due to their financial problems and the lack of support from other people. Their coping mechanisms include seeking assistance and having that strong support system from their family and or the people around them and having a positive mentality in building a strong positive outlook in life. Thus, the researchers came up with an action plan addressing the Sustainable Development Goal 3, God Health and Well-Being through a pamphlet. It includes all about the Solo parent Act of 2000 and the agencies they can approach as well as the benefits they can get that has a sole purpose of giving back all the hard works and sacrifices that every single mother rearing children with special needs has made for agencies to conduct programs that can help them and to spread awareness with their health condition.

Keywords: Challenges, Coping Mechanisms, Ilokano Single Mothers, Lived Experiences.

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SKINCARE IN THE WORLD OF SOCIAL MEDIA THROUGH

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Abstract: Beauty Vloggers on YouTube tend to be one of the most influential online personalities that were being praised and looked up by millions of viewers. These types of creators are termed in literature as “social media influencers” or SMI who opened a new platform for products to connect with consumers more directly and more organically. As a result, this study aimed to know the different ways how skincare are depicted by vloggers and the implications brought by the social media on the purchasing behavior of netizens. The research design that was utilized in the study is Phenomenological specifically descriptive and it is qualitative in nature. Beauty Vloggers from youtube and their viewers from the comment section were the participants, the instrument that was utilized are Document and Video analysis, purposive sampling were used in selecting the participants and the data gathered was analyzed through thematization where the evaluation of the participants were categorized into relevant themes. In conclusion, the way vloggers depict the skincare while they vlog is through the use of trends, reviews and them as a person that the viewers looks up to. While the researchers found three implications of skincare related vlogs on the purchasing decision of a consumer. First, social media gives the viewers similar interests with other viewers. Second, viewers gives out their opinions as well to the product they have purchased because of the video. And last, social media became the platform of spreading awareness and reminding people to take care of their skin.

Keywords: Beauty Vloggers, Influencer, Purchasing Decision, Skincare, Vlog.

References:


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SOCIOLINGUISTIC ANALYSIS OF ILOKANO LOANWORDS USED IN NEWS REPORTING IN A PHILIPPINE LOCAL TELEVISION NETWORK

ROMMEL V. TABULA

Abstract: While television functions its great role as provider of information, its programs are also indispensable sources of terminologies, specifically loanwords. This research endeavored to analyze the Ilokano loanwords used in news reporting in a Philippine local television network, the TV Patrol Ilocos. It characterized the loanwords in news reporting; probed the reasons why newscasters resort to loan words; and determined the implications of these loanwords to the Ilokano people. Utilization of descriptive research design and in-depth interview with 55 respondents chosen purposively was befitted in obtaining data. Transcripts of news reports on crime scenes in December 2015 served as corpora. Using Haspelmath’s (2009) Classification of Loanwords, it was found that Ilokano loanwords in news reporting were categorized as loan translation, loan blend and transliteration. Cultural influences or effects of colonization, non-equivalence of foreign terms to Ilokano language, prestige associated with loaning words from the donor language, and avoidance of long and incorrect translation of foreign words were perceived to be the reasons of loaning words. Many Ilokano loanwords used by news reporters were related to economic activity, political affairs, and cultural conditions of the Ilokano people. Thus, Ilokano loanwords used in news reporting are recognized as good source of new lexical vocabulary.

Keywords: Linguistics, Sociolinguistic Analysis, Ilokano Loanwords, News Reporting, TV Patrol Ilocos,

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AM I MORALLY JUSTIFIED OR UNJUST? A STUDY OF HUMAN ALIENATION, ISOLATION AND CONJUGAL CONUNDRUM IN ANITA DESAI’S CRY, THE PEACOCK

AMBICA GUPTA

Abstract: Anita Desai occupies a prominent position among Indo-Anglican novelists. She has written more than dozens of novels, collection of short stories and some articles too. In the male dominated society, she has highlighted the position of women who have always been the sufferers. Her literary career began with her novel, Cry, The Peacock published in the year 1963. In fact, the novel has been widely acclaimed by all the sections of society. This is the most prominent novel of Anita Desai as it gives voice to the distressing story of dull connubial relationship uttered by the main protagonist herself. The way the novelist has presented the predicament of Maya, the chief female protagonist in the so-called male dominated society and her deterioration at the altar of marriage, is highly commendable. Anita Desai’s novels are the platform of female quandary. She seems to be preoccupied with the inner world of a woman, her frustration and tempest flaming and fuming inside her mind which further intensifies her plight. Cry, The Peacock narrates the entanglement of modern Indian culture from a feministic point of view to highlight the female quandary as an individual in order to maintain self identity. Maya has been portrayed as Desai's mouthpiece to utter her views about women. As Cixous says, "Woman must write herself, must write about women and bring women to writing, from which they have been driven away as violently as from their bodies” (78)

The novel depicts the tale of immensely sensitive, emotional and insightful woman, Maya. Desai elucidates Maya’s ensnared feminine psyche right from the childhood to her mistimed death as a youth. It seems strenuous for a woman to conciliate with the harsh reality of life as she is weighed by the orthodox Hindu values. As married to an inconsiderate and benumbed husband Gautama, Maya is propelled from emotional uncertainty to dementedness first and assassination towards the end. This emotional strain occurs because of disharmony between husband and wife. Maya is quite expressive, temperamental, hazy, passionate, sensuous and sensitive and this is her only sin while Gautama is hard-hearted, realistic, disconnected and rational. We can see both are poles apart. Moreover, lack of communication between them leads to isolation and loneliness. Maya gets alienated, isolated and disconnected. With the passage of time, her disrupted psyche becomes more and more fidgety. Because of her mental crisis, she experiences loneliness. The increasing disharmony between both husband and wife reaches its climax when Maya assassinates her husband Gautama and after killing him, she herself commits suicide. The identity of a woman is exclusively linked to and explained by cultural and societal norms. Being deprived of her own identity, a woman, no doubt is defined in relation to a man. Simon de Beauvoir, in her work, The Second Sex puts it like, “One is not born, but rather becomes, a woman” (295).

References:


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EDUCATION WITHOUT BARRIERS:
PREPAREDNESS OF SAN FERNANDO SCHOOLS IN ACCOMMODATING
PERSONS WITH DISABILITIES

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Abstract: Inaccessibility of the physical environment, or the structure's aspect which makes it difficult to traverse with minimum effort, is one of the most significant barriers faced by Persons with Disabilities. It hinders them from performing and participating in common essential activities; one of which is attaining education. This study aims to determine the preparedness of educational institutions in San Fernando City, La Union to cater PWDs by evaluating the accessibility of their architectural designs through the narrated experiences of students with physical disabilities. Specifically, it aims to identify the physical barriers encountered within their respective schools, the PWD services the schools offer, and the students' and school administration's perception about the overall preparedness of their schools to admit PWDs. The researchers used descriptive research design and utilized semi-structured interview as their data gathering tool, with secondary and tertiary level students and school administrators as their respondents. The insights, opinions and experiences gathered were analyzed through thematization. The study was able to recognize existing accessibility elements that cater to disabled people's needs, together with numerous barriers that are obstructive to the fulfillment of their daily activities. It was revealed that some schools might not yet be fully accessible as they are right now; but their gradual efforts to comply with set guidelines and adjust to accommodate their students' needs for full PWD integration is worth acknowledging. Thus, the researchers suggest a requirement for numerous structural modifications and specific installations that would enhance mobility and PWD accessibility in physical school environments.

Keywords: Accessibility, Barriers, Educational Institutions, Persons With Disabilities (PWD), Physical Environment.

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LIVED EXPERIENCES AND COPING STRATEGIES: UNDERSTANDING TEENAGE SINGLE MOTHERS

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Abstract: Adolescent is bounded by the advent of puberty at the lower end and capacity to take an adult responsibility at the upper end. Pregnancy is one of the pivotal moments of a women’s life but not when they are young with a bright future ahead. Teenage pregnancy is one of the most difficult experiences any young can go through. The stress of pregnancy, revelation of pregnancy to parents and moving on despite the shame and worry can be nerve-racking. Indeed, pregnancy especially during teenage years will never be easy. This study aims to understand further the struggles of teenage single mothers and how they were able to adjust on the different struggles and difficulties in their new life as mothers. Specifically, it aims to determine the lived experiences and the coping strategies of these teenage single mothers. The researchers utilized a semi-structured interview and thematization for the study. The researchers found out that teenage mothers have different ways to cope up and endure all of their life stresses. They also have significant memories with their child that they live up to. The purpose of this research is to educate teens and the people around about the growing issue of teenage motherhood for them to be aware on how will they act whenever they encounter mothers with this situation.

Keywords: Health, Coping, Teen, Mothers, Experiences, Motherhood.

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