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Application of Stocha tic Proce e and Mathematical Stati tic to Financial Economic and Social Science VI

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VI

Applications of Stochastic Processes and Mathematical Statistics to Financial Economics and Social Sciences VI

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The Stochastic Exponential as a Solution of Functional Equations

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1. Introduction. For a continuous semimartingale $X = (X_t, t \geq 0)$, with $X_0 = 0$, the stochastic exponential is defined as

$$\mathcal{E}_t(X) = e^{X_t - \frac{1}{2}\langle X\rangle_t}, \quad t \geq 0, \tag{1}$$

where $\langle X\rangle$ is the square characteristic of the martingale part of X.

$\mathcal{E}_t(X)$ is the unique solution of the linear stochastic differential equation

$$Z_t = 1 + \int_0^t Z_s dX_s, \quad t \geq 0$$

and in this sense $Z_t = \mathcal{E}_t(X)$ is the stochastic analogue of the usual exponential function $f(x) = e^{cx}$, which is the unique solution of the linear differential equation $f_x(x) = cf(x), f(0) = 1.$

On the other hand, it is well known that the property

$$e^{c(x+y)} = e^{cx}e^{cy}, \quad \text{for all } x, y \in R \tag{2}$$

is a characterizing property of exponential functions and in a very wide class of functions (e.g., in the class of measurable functions) $f(x) = e^{cx}$, where

is of the form (7). We prove this theorem by using the Cauchy exponential functional equation and the corresponding "almost" version.

If the domain of validity of equation (7) consists only of a single Brownian Motion W ($V = \{W\}$), which corresponds (if we take $X = Y = W$ in (6)) to the equation

$$f^2(t, W_t) = f(4t, 2W_t + t), \quad t \geq 0, \tag{8}$$

then there exists a different from (7) continuous solution of equation (6) (see the counterexample after the proof of Theorem 1).

Note that the stochastic exponential $\mathcal{E}_t(X)$ transforms the class of continuous semimartingales into itself and this mapping is non-anticipative in the following sense: An adapted continuous process $F(t, X), \; t \geq 0$, depending on $X \in S$, is non-anticipative, if for any continuous semimartingales X and Y and $t \geq 0$

$$F(t, X) = F(t, Y), \quad \text{when} \quad X_s = Y_s \quad \text{for all} \quad s \leq t.$$

Therefore, it seems natural to consider a functional equation for stochastic exponentials in terms of non-anticipative functionals

$$F(t, X)F(t, Y) = F(t, X + Y + \langle X, Y\rangle), \tag{9}$$

where by the property (4) the stochastic exponential $\mathcal{E}_t(X)$ satisfies equation (9), which represents more general form of equation (6). But (9) will be not a characterizing property of the stochastic exponential, since there exists a whole class of solutions of (9) which are not stochastic exponentials. E.g., if

$$F(t, X) = e^{\int_0^t K(t,s)d(X_s - \frac{1}{2}\langle X\rangle_s)}, \quad X \in S, \tag{10}$$

where $(k(t, s), s \geq 0, t \geq 0)$ is bounded, measurable deterministic function, then it is easy to see that $F(t, X)$ defined by (10) satisfies (9), but such processes are not always stochastic exponentials, see Theorem 2 and the remark at the end of the paper. In Theorem 2 we prove that under some restriction on the class of non-anticipative functionals, the general solution of (9) is of the form (10).

2. Functional equation for a function of a semimartingale and its square characteristic. Let $W = (W_t, t \geq 0)$ be a standard Brownian Motion defined on a complete probability space $(\Omega, \mathcal{F}, P)$. Let $F = (\mathcal{F}_t, t \geq 0)$

be a filtration satisfying the usual conditions of right-continuity and completeness. Let $F^W = (F_t^W; t \geq 0)$ be the filtration generated by the Brownian Motion W.

Let S (resp. M) be the class of continuous semimartingales (martingales) vanishing at 0.

Let $M^W(I)$ be a sub-class of stochastic integrals $h \cdot W$ with respect to the Brownian Motion W with integrands h, such that $h_u = I_{[s \leq u \leq t]}; 0 \leq s \leq t$.

Let $(f(u; v); u \geq 0; v \in R)$ be a function of two variables . We consider the functional equation

$$f(\langle X \rangle_t; X_t) f(\langle Y \rangle_t; Y_t) = f(\langle X + Y \rangle_t; X_t + Y_t + \langle X; Y \rangle_t); \qquad (11)$$

for any $X; Y \in V$ and P- a.e. for each $t \geq 0$, where V is some class of continuous semimartingales, the domain of validity of equation (11).

Theorem 1. Let $(f(u; v); u \geq 0; v \in R)$ be a function of two variables. Then the following assertions are equivalent:

a) The function f is a continuous strictly positive solution of the functional equation (11) with the domain of validity $V = S$.

b) The function f is a continuous strictly positive solution of the functional equation (11) with the domain of validity $V = M^W(I)$.

c) The function f is of the form

$$f(u; v) = e^{cv - \frac{c}{2}u} \quad \text{for some constant} \quad c \in R.$$

If we shall consider only measurable solutions, then the following two conditions will be equivalent:

b') The function f is a measurable strictly positive solution of the functional equation (11) with the domain of validity $V = M^W(I)$.

c') The function $f = (f(u; v); u \geq 0; v \in R)$ coincides with the function

$$e^{cv - \frac{c}{2}u} \quad \text{for some constant} \quad c \in R \qquad (12)$$

almost everywhere with respect to the Lebesgue measure on $R_+ \times R$.

Proof. The implication *a*) $\to$ *b*) is evident. Let us prove the implication *b*) $\to$ *c*).

It follows from equation (11) that for any bounded deterministic functions h and g

$$f\left(\int_0^t h_u^2 du; \int_0^t h_u dW_u\right) f\left(\int_0^t g_u^2 du; \int_0^t g_u dW_u\right) = \qquad (13)$$

$$= f\left(\int_0^t (g_u + h_u)^2 du; \int_0^t (g_u + h_u) dW_u + \int_0^t g_u h_u du\right)$$

P- a.e. for each $t \geq 0$.

For any fixed pair $s \leq t$ if we take $h_u = I_{(u<s)}$ and $g_u = I_{(s \leq u \leq t)}$, from (13) we obtain that P-a.s.

$$f(s; W_s) f(t - s; W_t - W_s) = f(t; W_t). \tag{14}$$

From (14) we have that

$$0 = E I_{(f(s;W_s) f(t-s;W_t-W_s) \neq f(t;W_t))} = \tag{15}$$

$$= \int_R \int_R I_{(f(s;x) f(t-s;y) \neq f(t;x+y))} \varphi(s;x) \varphi(t-s; y-x) dx dy;$$

where $\varphi(s;x) = \frac{1}{\sqrt{2\pi s}} e^{-\frac{x^2}{2s}}$.

Therefore, for any $s >$

$$= \exp\{c(X_t + Y_t) - \frac{c}{2}\langle X + Y\rangle_t + c\langle X, Y\rangle_t\} = f(\langle X + Y\rangle_t, X_t + Y_t + \langle X, Y\rangle_t)$$

P-a.s. for any $t \geq 0$.

The proof of the second part of Theorem 1 is similar if we use corresponding results on "almost" solutions of equation (16).

$b') \Rightarrow c')$. It follows from results of [2] and [5] that (29) implies

$$f(t, x) = \exp\{cx + bt\} \quad \text{for some} \quad b, c \in R, \tag{19}$$

almost everywhere with respect to the Lebesgue measure on $R_+ \times R$.

From (18) we have that

$$f^2(t, x) =$$

then there exists a different from (7) continuous solution of equation (22). Let $g(t, x) = \ln f(t, x)$. Then (22) is equivalent to equation

$$g(t, W_t) = \frac{1}{2} g(4t, 2W_t + t), \quad t \geq 0. \tag{23}$$

Let $g(t, x) = |(2x - t)t|^{\frac{1}{3}}$. It is evident, that this function satisfies equation (23), since

$$g(4t, 2$$

Let $f(t; z; w)$ be a measurable function of three variables and let $f(t; z; W_t)$ describes the price of a stock at time t 0 with initial price z.

If we suppose that one can sell or buy any part of the stock, it will be natural to assume that $f(t; z; W_t)$ to which the initial price (capital) z evaluates during the time interval t, does not change by dividing the original initial capital $z = x + y$ into separate investments $x; y$

which is the same as (26) with $c =$ and $b = {}^2/2$.

Finally we notice that using the stochastic flow approach and some regularity assumptions (see [8]) it is also possible to derive equation (25) from the semigroup property (28).

4. A functional equation for non-anticipative functionals.

The mapping $h : [0;T] \times C[0;T] \to R$ is non-anticipative, if for any $\omega;\omega' \in C[0;T]$ and $t \in [0;T]$

$$h(t;\omega) = h(t;\omega'); \quad \text{when} \quad \omega_s = \omega'_s \quad \text{for all} \quad s \le t.$$

Consider the class of adapted continuous processes $F(t;X);\ t \ge 0$, which depend on $X \in S$, defined by

$$C = \{F;\ F(t;X) = e^{h(t;X - \frac{1}{2}\langle X\rangle)};\ X \in S; \text{for some continuous (in uniform norm),}$$
$$\text{non-anticipative functional } h(t;\omega)\}.$$

Theorem 2. The general solution of the functional equation

$$F(t;X)F(t;Y) = F(t;X + Y + \langle X;Y\rangle); \quad \text{for all} \quad X;Y \in S; \tag{31}$$

in the class C, is of the form

$$F(t;X) = e^{\int_0^t K(t;s)d(X_s - \frac{1}{2}\langle X\rangle_s)}; \quad X \in S; \tag{32}$$

where $(K(t;s); s \ge 0; t \ge 0)$ is a deterministic function with $K(t;s) = 0; t \le s$, such that

i) $K(t;\cdot)$ is cadlag and has a finite variation, for each $t \in [0;T]$;

ii) $\int_0^T \omega_s K(\cdot;ds)$ is continuous, for each $\omega \in C[0;T]$.

proof. Let F be a solution of equation (31) from the class C. Then it follows from (31) and from the definition of the class C that

$$\begin{aligned} h(t;X) + h(t;Y) &= \ln F(t;X + \frac{1}{2}\langle X\rangle) + \ln F(t;Y + \frac{1}{2}\langle Y\rangle) \\ &= \ln F(t;X + Y + \frac{1}{2}(\langle X\rangle + \langle Y\rangle) + \langle X;Y\rangle) \\ &= \ln F(t;X + Y + \frac{1}{2}\langle X + Y\rangle) = h(t;X + Y) \end{aligned}$$

for any $X; Y \in S$.

Since a deterministic function is a semimartingale if and only if it is of finite variation and the functions of finite variations are dense in C, it follows from the continuity of h that

$$h(t; \omega + \omega') = h(t; \omega) + h(t; \omega') \;\; \text{for all} \;\; \omega; \omega' \in C. \tag{33}$$

By the Riesz theorem (see, e.g. [3]) for each t there exists a cadlag function $G(t; \cdot)$ of finite variation, such that $G(t; s) = G(t; T); s \geq t$ and

$$h(t; \omega) = \int$$

It is evident that $F($

HADAMARD MATRICES AND SOME RELATED PROBLEMS

GEORGE GIORGOBIANI, VAKHTANG KVARATSKHELIA

Abstract. In this note, we consider a special case of the Hadamard matrix and prove one of its properties.

1. Introduction

There are various types of matrices in the literature having distinct properties useful for numerous applications, both practical and theoretical. The famous Hadamard matrix with orthogonality property was first defined by J.J. Sylvester [1] in 1867 and studied further by J.S. Hadamard [2] in 1893.

Definition 1.1. *A Hadamard matrix is a square matrix with entries equal to* ± 1 *whose rows (and hence columns) are mutually orthogonal.*

In other words, a Hadamard matrix of order n is a $\{1, -1\}$-matrix H_n satisfying the equality

$$H_n H_n^T = n I_n,$$

where I_n is the identity matrix of order n.

In 1867 Sylvester proposed a recurrent method for the construction of Hadamard matrices of order $2n$. Namely, if H_n is a Hadamard matrix of order n, then the matrix

$$\begin{pmatrix} H_n, & H_n \\ H_n, & -H_n \end{pmatrix}$$

is a Hadamard matrix of order $2n$.

There are several operations on Hadamard matrices which preserve the Hadamard property: (a) permuting rows, and changing the signs of some rows; (b) permuting columns, and changing the signs of some columns; (c) transposition.

Hadamard observed that a construction of Sylvester, mentioned above, produces examples of matrices that attain the bound when n is a power of 2, and produced examples of his own of sizes 12 and 20.

It is easy to prove that the order n ($n \geq 4$) of any Hadamard matrix is divisible by 4. The converse is a long-standing conjecture.

Conjecture 1.1. *For every positive integer n, there exists a Hadamard matrix of order $4n$.*

Conjecture 1.1 is true for $4n = 2^k$. Currently unknown smallest order is $4n = 668$.

The problems considered here have been discussed by the authors more than once (see, for example, [3–5]).

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2. Sylvester matrices

The sequence of the matrices defined by the following recurrence relation:

$$S^{(0)} = [1]; \quad S^{(n)} = \begin{bmatrix} S^{(n-1)}, & S^{(n-1)} \\ S^{(n-1)}, & -S^{(n-1)} \end{bmatrix}; \quad n = 1, 2, \dots$$

is a particular subclass of the class of Hadamard matrices and are named as the Sylvester (or Walsh) matrices. $S^{(n)} = \left[s_{ij}^{(n)} \right]$ is a square matrix of order 2^n, where $s_{ij}^{(n)} = \pm 1$. For example,

$$S^{(1)} = \begin{bmatrix} 1, & 1 \\ 1, & -1 \end{bmatrix}; \quad S^{(2)} = \begin{bmatrix} 1, & 1, & 1, & 1 \\ 1, & -1, & 1, & -1 \\ 1, & 1, & -1, & -1 \\ 1, & -1, & -1, & 1 \end{bmatrix}; \quad \text{and so on.}$$

Let $S^{(n)} = \left[s_{ij}^{(n)} \right]$ be a Sylvester matrix of order 2^n. Consider the following expression

$$\varrho^{(n)}(m) = \sum_{j=1}^{2^n}$$

Proof. It is easy to see that $\frac{3n+7}{9}2^n + (\ \ 1)^n\,\frac{2}{9}$

d by

In the article we will consider one of the opportunities of IT system installation for Georgian healthcare organizations: because of IT systems usage all hospital expenses[1] can be recognized and classified. Knowing exact structure of hospital expenses take crucial role get appropriate financing for medical services from governmental and custom insurance organizations. In our example we are considering reimbursement system from universal healthcare program in Georgia.

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Hospital Expense Allocation Strategies

During designing hospital is very important to forecast all types of expenses and allocate them in the service Charge Masters.

Service Charge Masters, or Charge Description Master (CDM), is a comprehensiveBTerdi of items ble

Hospital Expense Structure (% From Revenues)	
Salaries	45%
Nursing Staff Salaries	25%

Main reason of Charge Master creation is to determine the real costs of services and to adjust market prices for provided services.

Main Challenges of healthcare service expense allocations in Georgia

Georgian healthcare system developed very fast from 2007 according to the Government healthcare development and privatization project and during this fast development, service prices were regulated by market according to the competitive environment. Georgian hospitals adjusted their service prices according to the local healthcare market's historical pricing strategy.

From 2012 Government established Universal Healthcare Program and all hospitals were required to participate in elective surgical reimbursement program with historical prices (within past 1 year), plus 10% of values. And most of the hospitals still participate in Universal Healthcare Program with same prices. Despite inflation indicators, hospitals cannot increase their service prices.

Most of the hospitals never did charge masters and never calculated real costs of the services provided by them.

Regardless that most of the expenses of the hospital have exponential or beta distributions, differences between expenses and reimbursements from government according to Universal Healthcare Program are normally distributed with mean 136,000 and standard deviation 87,000. We have used Monte Carlo simulation to get annual differences between costs and reimbursements during 10 years. Converting amounts of differences into percent of changes we have gotten lognormally distributed present value during 10 years of differences. We have used 10,000 iterations for Monte Carlo simulation. The table below presents results from Monte Carlo simulation.

Amounts in (000)		Years	Cost Differences
Cost Differences	136	1	246.31
St.Dev.	87	2	166.51
Disc Rate	11%	3	239.22
		4	169.05
PV_0	1,091.63	5	34.06
PV_1	965.40	6	210.15
Z	-0.12288	7	182.46

7

Based of this model we have calculated real option value with Jarrow-Rudd binomial mode [5]. We cannot us most frequently used Cox Ross Rubinstein [6] model because lognormal standard deviation is less than discount rate ς what violates the initial assumptions of Cox Ross Rubinstein binomial model.

The table below presents results of binomial valuation of the real option.

r	11%
`	0.1049
Expacted Cost Difference	805.23
N	5
ɲ	0.2
Investment	500
T	10
Up factor (u)	1.070
Down factor (d)	0.974

Using different amounts of investments as strike in real option model we can show the relationship between investment size and the amount of the real option.

[1] M. O'Hara, R. Watson and B. Cavan, "Managing the three levels of change," *Information system management,* p. 16, 1999.

[2] C. Ullrish, "Valuation of IT Investments Using Real Options Theory," *Business & Information Systems Engineering,* p. 24, 2013.

[3] R. Banker, S. Wattal and J. M. Plehn-Dujowich, "Real Options in Information Systems ς a Revised Framework," in *ICIS*, 2010.

[4] J. Janney and G. Dess, "Can Real-Options Analysis Improve Decision-Making? Promises and Pitfalls," *The Academy of Management Executive,* vol. 18, no. 4, p. 16, 2004.

[5] Y. S. Kim, S. Stoyanov, S. Rachev and F. Fabozzi, "Multi-Purpose Binomial Model: Fitting all Moments to the Underlying Geometric Brownian Motion," *arXiv:1612.01979v1,* p. 10, 2016.

[6] J. C. Cox, S. A. Ross and M. Rubinstein, "Option pricing: A simplified approach," *Journal of Financial Economics,* vol. 7, no. 3, p. 34, 1979.

Integrated Management System in Education

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Abstract

Importance of integrated management systems (IMS) is growing more and more for organizations Interest in this subject indicates that IMS are seen as “management systems of the future”. IMS is one of the most effective tool to

leaders understand the importance of this standard in education and mostly it is considered as a standard for construction or oil production companies. Later in the article we will see the importance of integration of both these standards for effective education management.

Finally, Information Technology Management, has become vitally important, especially while teaching and working online. It is important to combine Information Technology standard into the IMS in order to have effective human resources management. The most common and spread standard for implementation is ISO/IEC 20000-1:2018

PDCA Cycle in Integrated Management

H. James Harrington said: “Measurement is the first step that leads to control and eventually to improvement. If you can’t measure something, you can’t understand it. If you can’t understand it, you can’t control it. If you can’t control it, you can’t improve it.” https://www.qualitydigest.com/may06/articles/02_article.shtml)

William Edward Deming, a prominent American researcher, similarly to Japanese, believed that management staff and all employees should be involved in the process of continuous improvement. He created 14 principles that later became the basis of the philosophy of quality in the organization and continuous improvement cycle PDCA (Plan -

According to all mentioned above, the next step is making an effective plan, where all the employees will be involved and feel as part of the team. So, to sum up, the “Plan” cycle, it starts from analyzing the previous work in order to make an effective action plan. However, just because we made a good plan, does not mean that it will occur. Hence, the next step of Deming Cycle is “Do”. Here the top management of the education organization needs to implement all the planned processes. Here is very important the term of team work as far as the teachers, lecturers, technical personnel and other employees should be involved in doing process. Otherwise, the aim of the organization won’t be achieved as effectively as with their involvement.

Every process in business should be studied or checked. Within PDCA (Plan – do-check-act) Cycle Deming also uses PDSA (Plan-Do-Study-Act) cycle. In order to study or check, we should first have effective measurement tools. By this I mean, objective and reflective employees’ observation forms; appropriate, customer satisfaction questionnaires, where both, quality and occupational health and safety standards requirements will be included. At stage of Check/Study, we should make a clear and obvious feedback as far as this stage is tightly connected with continuous improvement. Our Academic Personnel’s professional development is based on effective evaluation system. At the same time, incidents, non-conformances, risks and near misses should be studied and investigated deeply in order to set effective preventive actions and avoid them in the future.

The Final stage of the Cycle is “Act”, which includes taking actions based on the results of measurement. Setting effective actions in order to reduce the risks and avoid incidents and/or non conformances is a path to continuous improvement. Act is a part of the cycle, which analyses all other

94.4% or interviewed employees notice that they have systematic observations and receive the observation feedback on time.

Knowledge of Psychology – the new philosophy is based on the understanding of people and their differences, and a commitment to applying systematic thinking

Sanitary – Hygiene Service, which is responsible for keeping the whole infrastructure clean following the regulations and norm of the standard and be involved in teaching students (in schools) how to keep and role of cleanliness of their own space.

Food Service,

Educational governance today increasingly needs to be understood as *digital educational governance*. The monitoring and management of educational systems, institutions and individuals is taking place through digital systems that are normally considered part of the backdrop to conventional policy instruments and techniques of government; technical systems that are brought into being and made operational by certain kinds of actors and organizations, and that are imbued with aims to shape the actions of human actors distributed across education systems and institutions.

In internal administration, the use of technologies has been recognized on a comprehensive scale. Educational administration is the process, by which methods, principles and procedures are put into practice within the educational institutions. It is vital for the individuals to carry out these functions in accordance to the goals and objectives. When the individuals are carrying out the governance and administrative functions, they need to ensure that they are able to achieve academic goals effectively. (Oyedemi, 2015). Today technologies in managing educational institutions can be used not only as a way of effective communication, but also correct time management, effective planning and decision making and objective measurement and monitoring tool.

Nowadays, in the era of timeless, effective and fast communication is one of the most important in management. People should have a free and fast access to necessary information. The communication processes between the individuals within the working environment is an easy and less time-consuming process. The individuals are able to access various forms of technology. In other words, connectivity is

Resources:

Jeremy Weinstein, Steve Vasovski, pp 5-11; the PDCA Continuous Improvement Cycle Module 6.4

Bluebird Holding Limited Integrated Management System; pp 12-16; 22-25; 44-48; 58-60; Version 01

Scott Eacott; A theory and Methodology for educational leadership, Management and Administration, pp 33-35; 67-70; 115

Harry Tomlinson; educational Leadership; pp 11-13; 17-19

https://www.iso.org/standard/70636.html

If $_1;\ _2\ 2\ F$, then $_1 = \ _2$ (P-a.s.) or $_1 \quad _2$ (P-a.s.) mean that $P(\ _1 \quad _2) = 0$ or $P(\ _1$

Theorem (B) follows from Theorem (A) if we apply the latter to the process

Hence $A^1_1 < 1$ $A^2_1 < 1$ and

$A^1_1 < 1$ $fX^l\ !\ g = fX^l\ !\ g \setminus fX = X^l g + fX \not\in X^l g$

$= fX\ !\ g \setminus fX = X^l g + fX^l\ !\ g \setminus fX \not\in X^l g$

Organizational Triggers in Relation to Service Employees Performance

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" anagement # orking $roup
E ucation " anagement %nformation System
$eorgian American &niversity Ph ' stu ent

ABSTRA(T

)ut in respect to the larger)usiness o)!ectives* This implies that each part of +ork is complete +ith intentionality an for the correct purpose*

- KP%s foster personal gro+th

0ot every pro uct up ate or campaign +ill reach their targets* But +hen you monitor performance against those targets, it creates an environment of learning* #ith KP%s, teams are a)le to see e.actly ho+ they?re engaging at any given moment* #hen you track KP%s, especially once you o so on a real-time KP% ash)oar , you?re a)le to ask +hat, +hy, ho+ an +hen*** an o so +henever* This makes to learn from successes an failures a aily activity* Another reason +hy KP%s are important for private gro+th)uil s off the concept of increase morale* Allo+ing employees to o)serve their performance an respon +ithin the moment implies that they are more likely to attain their goals an)etter un erstan a +ay to o so +ithin the future* This sense of continuous improvement allo+s people to realize much more than they may think, +hich is important for +orkplace satisfaction an continue personal gro+th* a vice a)out lo+ering our cholesterol, an sometimes +e have to skip a chil ,s foot)all game)ecause +e are o)ligate to appreciate the staff an provi e them consistently)ecause they +ork late every ay an so on* This is ho+ our environment interferes +ith our lives an +e have to act against our +ill*

Our environment has fee)ack as a trigger* After all, our environment is constantly giving us ne+ information that is important to our lives an changing our)ehavior* But the similarities en here* Our environment often lea s to)a)ehavior an this is one against our +ill an against)etter !u gment an +ithout a+areness, +here a +ell- esigne fee)ack loop lea s to the esire)ehavior* (hange is taking place*

'r* Ro)ert (ial ini is a famous author of the)estseller)ooks a)out influence, he is +i ely kno+n for his)reakthrough i eas in the fiel of influence an po+er research, +i ely regar e as the C$o father of influence,,)ecause of his years of scientific research on the psychology of influence* (ial ini escri)es si. triggers as the main rivers to influence others 4(ial ini, 566D9< reciprocity, scarcity, consistency an commitment, authority, liking, social proof*

Authority is one of the scariest psychological triggers* # here social evi ence is)ase on popular po+er - i*e*, people C!ust like me,, - authority takes a principle step to use the po+er of particular in ivi uals* Authority is angerous)ecause it has po+er* Accor ing to (ial ini, there is a ten ency that the action may)e repeate in response to simple sym)ols rather than its essence* Research has sho+n that the most effective sym)ol can)e automo)iles an clothes* %n other +or s, people react not only to authority,)ut also to their appearance*

Fiking is another o)vious trigger that is not at all consi eration of these thoughts or perceptions that prompt in ivi uals to react* Fouis an Sutton 47HH79 argue that some type of spark or trigger is re/uire for people to maneuver from automatic mo e to cognitively processing things at han an making sense of it* Such cognitive processing is more active than simply noticing something, +hich is one in automatic mo e* Accor ingly, +ithin the +orkplace, a particular event is re/uire to trigger employees to maneuver from the automate , ay-to- ay processing escri)e)y Fouis a

The KP%s aime to+ar)oosting the performance of t

The secon part of this stu y involves con ucting /uantitative research)ecause it seeks to analyze ho+ literature revie+ an /ualitative research relate to performance in uce)y organizational triggers in an organization*

Lualitative research lea to the efining of the seven triggers, consi ere)y managers in target organization as +i ely use * ;ollo+ing the main goal of the stu y, for each of the trigger the follo+ing hypothesis is teste in the /ualitative re

As long as the /uantity # is compute , it is compare to a critical value from the #ilco.on signe rank test ta)le accor ing to the sample size an the significance level 65 #e test all the hypothesis for 6 = 75785

;or the hypothesis testing in practical research 4for each of the ela)orate triggers it is that trigger significantly influences the performance9 there +as use a survey +ith the /uantitative ata analysis* %nvolvement of sample population +as M= employee*

Sample pairs that +ere use in hypothesis are<

Organizational trigger	Performance

Base on the results +e conclu e that the null hypotheses in all cases is re!ecte , +hich means that all organizational triggers G scarcity, consistency an commitment, social proof, ne+ e.ecutives, ne+ service announcement, increase in e.penses an a+ar s influence the employee performance* %n particular, all of the organizational triggers change employee performance significantly*

These fin ings scientifically prove that +ith organizational triggers managers can really manage service employees, performance* So a lot epen s on them* By focusing on the evelopment of

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