QUANTITATIVE MARKETING RESEARCH IN PRODUCT SALES DATA ANALYSIS USING DEVELOPMENT AND DIFFUSION OF THE INNOVATION CONCEPT

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Abstract:

Quantitative marketing research is the application of quantitative research techniques to the field of marketing. in the modern marketing viewpoint[16] that marketing is an interactive process in which both the buyer and seller reach a satisfying agreement on the Kotler[2,3]"four Ps" of marketing: Product, Price, Place (location) and Promotion [2,3].As a social research method, it typically involves the construction of questionnaires and scales. People who respond (respondents) are asked to complete the survey. Marketers use the information so obtained to understand the needs of individuals in the market place, and to create strategies and marketing plans[2,3].

Keywords*:-** ***marketing research, sales volume,innovation, electrical system analogy, quantitative marketing.

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1Introduction:

1.1Problem audit and problem definition – Problem identification that covers the various aspects of the problem and the kind of information is needed , its Kuo[12] Conceptualization and operationalization , the exact way to define the concepts involved, the translational of these concepts into observable and measurable behaviors, design of hypothesis specification and the point to test, research design specification and the type of methodology we are using for example : questionnaire and survey question specification

1.1 **Market Trends** – Market trend follows the patterns[10] with social and cultural observations on a daily basis, to give a dynamic source of creative stimulation. It is fully interactive, delivering unique results depending on the choices and searches that you make. Its meaningful synergy of research and projection will help you to make a decisive creative leap.

1.2 **Consumer Trends** – Habits or behaviors currently prevalent among consumers of goods or services. Consumer trends track more than simply what people buy and how much they spend. Data collected on trends may also include information such as how consumers use a product and how they communicate with the brand of social network**.**

1.3 **Product Innovation**- Thus product innovation can be divided into two categories of innovation: development of new products, and improvement of existing products, it is basically one step ahead of approach toward s the merger of segmentation[17] process in which new range of product we produce and Large amount of customer will reach towards the specified product range**.**

1.2.1Social network- Family, and friends and their families, that together create an interconnected system through which alliances are formed, help is obtained, information is transmitted, and strings are pulled. In an organizational setting[16], it usually constitutes the group

of one's peers, seniors, and subordinates who provide privileged information on how to get things done, how the power structure operates, and who holds the strings at present.

1.2.2 System- An organized, purposeful structure regarded as a whole and consisting of interrelated and interdependent elements [16](components, entities, factors, members, parts etc.). These elements continually influence one another (directly or indirectly)[10] to maintain their activity and the existence of the system, in order to achieve the goal of the system

1.2.3 Division of Systems-

Systems are divided into two categories: (1) Closed systems: theoretical constructs that have solid boundaries and where only the components within the system[11] are assumed to exist in a self-sufficient state. All other influences or variables from outside the system are considered to be nonexistent or insignificant for the purpose of the system analysis[16]. (2) Open systems: the real-world systems that have permeable boundaries through which they continually exchange energy, material, and information with their external environment[17] the larger system in which they exist. Different systems methodologies (such as systems dynamics and systems thinking) classify systems differently. and here we are dealing with closed system.

1.2.4Reliability and validity of closed systems Research should be tested for reliability, generalizability, and validity. Generalizability is the ability to make inferences from a sample to the population.

1.2.5Reliability is the extent to which a measure will produce consistent results. Test-retest reliability checks how similar the results are if the research is repeated under similar circumstances. Stability over repeated measures is assessed with the Pearson coefficient. Alternative forms reliability check. The value of the Pearson product-moment correlation coefficient is adjusted with the Spearman-Brown prediction formula to correspond to the correlation between two full-length tests. Reliability may be improved by increasing the sample size.

1.2.6Validity Content validation (also called face validity) checks how well the content of the research are related to the variables to be studied. Are the research questions representative of the variables be such that demonstration that the items of a test are drawn from the domain being measured. Criterion validation checks how meaningful the research criteria are relative to other possible criteria. When the criterion is collected later the goal is to establish predictive validity. Construct validation checks what underlying construct is being measured. There are three variants of construct validity.

1) *Convergent validity (how well the research relates to other measures of the same construct)*

2) *Discriminate validity (how poorly the research relates to measures of opposing constructs)*

3) *Nomo logical validity (how well the research relates to other variables as required by theory)*

Internal validation, used primarily in experimental research designs, checks the relation between the dependent and independent variables.

***1.2.7Validity implies reliability*:** a valid measure must be reliable. but reliability does not necessarily imply validity: a reliable measure need not be valid the study results lead to the acceptance (non-rejection) of the null hypothesis even though it is actually false.

Concept of data assessment tool: like in electrical engineering we use phasors in which it clearly gives the representation of magnitude and direction so here drawing wave form by substituting different points In this representation.

2Phasor representation of current and voltage in circuit

Let the waveform of current is **I = Im Sinωt**

V= Vm Sinωt

Phasor

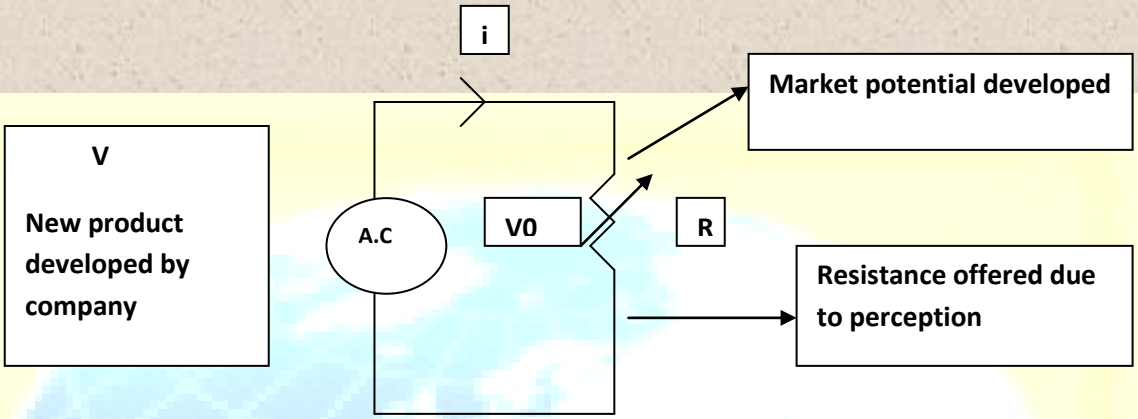
Current phasor **voltage phasor**

Let *current* is defined by the flow of new product[11], and *voltage* (Electrical potential) is defined by the potential developed by the product in market.

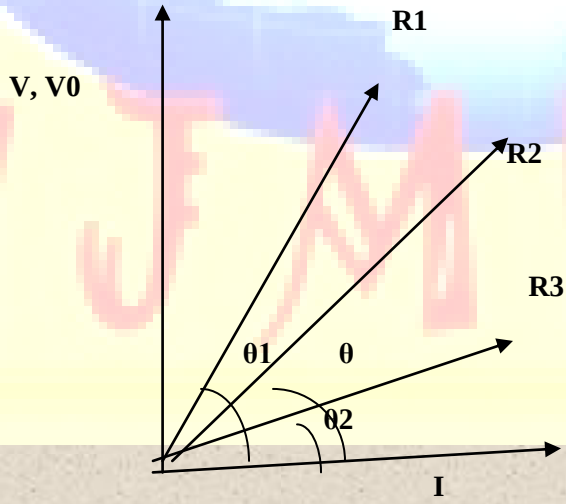
There is always resistance Oke[9] offered by the market for any new innovative product, this resistance is variable in nature as market (people)[10] perceive the product differently as they came to compare the features, cost & quality of product.

2.1Electrical Circuit: as universal set, include source (product producing company), input to market (Electrical potential), resistance (variable depends upon the perception of people) & current (as flow of product)[11]

2.2Source time period is it is alternating in nature of a time period this fixing for any particular product



V=I R is the linear relationship which is defined by ohms law.



Resistance offered by market due to different perception level

1) **V/I = R** since we are increasing the value of resistance as constant voltage, flow of current

(Product) decreases.

2) **V/I = R** another condition as we Decrease the value of resistance at constant voltage the Value of current increase we Quote this phenomenon as ohms law in Electrical circuit[13].

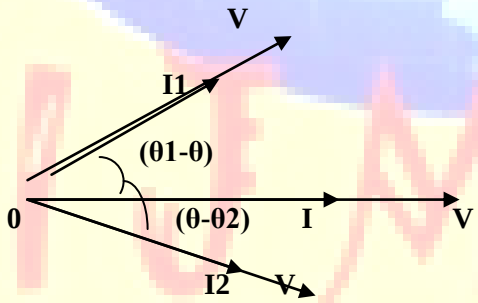
V = Vm Sinωt where Vm is Peak Value

Vm Sinωt = RI (according to ohm's law)

I= Vm/R Sinωt =Im Sinωt thus Im =Vm/R

At initial Stage the production of product (new product)[11] is Constant thus we take the source

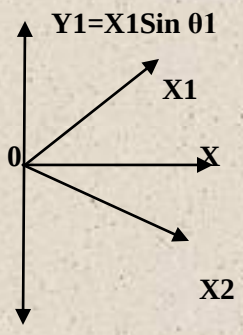
as constant Potential source[13].



Taking (I, V) = Ref X

(I, V) = X1 at (θ1-θ) difference

(I, V) = X2 at (θ-θ2) difference



Y2=X2 Sin θ2

Y1-Y2=0

Y1=Y2

X1Sin θ1=X2 Sin θ2

X1= X2 Sin θ2/ Sin θ1…… (1)

X+X1Cos θ1+X2Cos θ2=0

X+X2Sin θ2/Sin θ1* Cos θ1+X2Cosθ2=0

X+X2Sin θ2Cot θ1+X2Cos θ2=0; **X= -X2(Sin θ2Cot θ1+Cos θ2)**

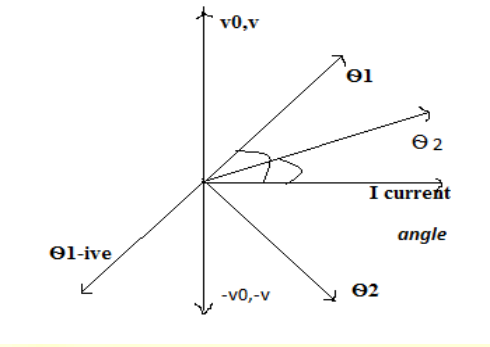
dX/d θ2 = -X2(Cos θ2Cot θ1-Sin θ2) …… for maximum product flow(current) with increased

Its value **dX/dθ2=0**

0= -X2(Cos θ2Cot θ1-Sin θ2)

X2=/=0 ……so (Cos θ2Cot θ1-Sin θ2) =0

Cos θ2Cot θ1=Sin θ2



Cot θ1= tan θ2

Π/2- θ1= n Π + θ2

θ2= (Π/2-nΠ) - θ1

θ2= (1/2-n) Π- θ1……..n=1, 2, 3, 4……k

Which means that voltage is negative even current in a circuit

Is positive illustrating that market potential shows the -ive tendency[8] even there is supply of products, indicates at constant supply there is decrease in demand.

Angles specified	Value of n (1)	Value of n (2)	Value of n (3)
θ1	0	0	0
θ2	-Π/2- θ1	-3Π/2- θ1	-5Π/2- θ1

3.1Program supporting table with output Graph

```
y1= [1 2 3];

y2= [-1.57 -4.71 -7.85]; where (∏ =3.14)

p= polyfit(y1,y2,10);

x1 = 0:0.1:10;

x2 = polyval(p,x1);

plot( y1,y2,'o',x1,x2);

grid on
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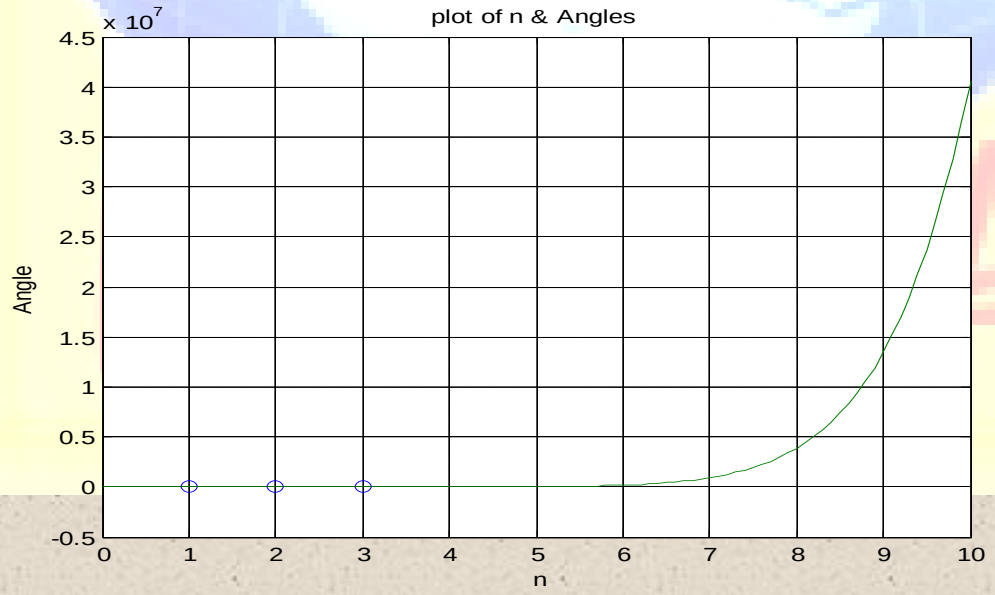

***4Conclusion*:-** The desire and need to reduce product development[11] risk is critical in today's environments. The outcome between evolving a design incrementally, and, embarking on a discontinuous path is of critical concern to many firms. This is especially true if there are new processes and product technology involved[5]. The matrix shown here contains many of the elements where investigation can highlight the necessary data required for decisions of this nature. New and exiting Kuo[12] products evolve over time and many companies lose sight of where they ended up - and of course the lost opportunities that accompany this. Parallel with this the need to accelerate new product developments[5] to avoid expensive overruns and the issue becomes more complex. as *the curve shows just double in time of development andincrease in profit Margin (ie 3x2=6years) in the case of last change (n=3)in the Product line.*

A simple but effective technology audit using the tools developed can help determine a path for improvement. Christensen[5] Many leading product based companies find that the majority of their profits originate from products launched in the last 3-5 years. If this is the case then it goes without saying that this type of firm must have a pipeline of new products[11] already mapped for the next few years. If this is not the case and firms are reliant for their profitability from products developed over 5 years ago then risk takes on a different focus. Here risk can appear from unexpected sources. For example, new and disruptive technology, or, market erosion from competitors who augment product functions to displace existing products at no extra cost can bring surprises**.**

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