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TOURISM SUSCEPTIBILITY AND SUSTAINABILITY

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Abstract:
Tourism lies at the very bedrock of human civilization, and tourism is no longer a means to merely satiate one basic needs, as it fulfilled needs for water, fodder, food etc, to human beings and accompanying pets in ancient times. Nowadays, it is being presented as a well-crafted product. Nonetheless tourism as a product is quite different when compared to factory outlets. This paper is an attempt to develop a mathematical model. It introduces a measure of tourism susceptibility χ, and how tourism as a product is carved out of integrating various services, viz. travel, accommodation, fitness, culture, adventurism, health, ecotourism, pilgrimage sites etc. Through this model, stages of growth of tourism and all its integrands could be efficiently and effectively managed, risk could be minimized, and the welfare of hosts could be assured. It analyses the saturation point, i.e., the maximum growth of tourism until physical carrying capacity is achieved. It estimates that the velocity of money, shows that it increases as tourism grows, provided ample physical infrastructure to support it at the destination is easily available. Expression for Seigniorage revenue out of tourism is being established; this model also predicts that tourism gain could be realized and sustained through a monetary feedback mechanism responsive to coupling effects and sustainable development of the natural environment.

Keywords: Tourism susceptibility, Tourism development model, Carrying capacity, Seigniorage revenue, Sustainable tourism

INTRODUCTION

During the prehistoric age, when human beings were leading a nomadic life, they initially practiced hunting and gathering, and the cultivation of crops enforced a settled human life. However, during the primitive phase of agriculture, humans practiced shifting cultivation of crops, i.e., slashed and burned a patch of forest cultivated crops of their needs until the land turned infertile, the yield of these crops hardly fulfilled their basic needs, so he struggled for his existence, over time human excelled in cultivation, now he could produce beyond his needs, diversification in his choices underwent, barter system of exchanging goods came into existence, now he could create and store some material wealth, God and religion emerged as society became complex, the fact that religion was not divinely or supernaturally inspired and was, in fact, a product of society (Durkheim, 1982). Growth in religious ritual up Some religious faiths propounded that touring and charity are a must for salvation, e.g., Muslims visit Mecca and Medina, Hindus visit Char Dhams, Christians visit Jerusalem etc. for their salvation. Therefore, pilgrimage tourism was the only prominent form of tourism apart from travel for conquests. As of today, pilgrimage tourism is one of the largest forms of tourism being performed on the globe. The tourism industry, as of now, is not a standalone industry. Rather, it is a confederation of industries viz (Widiatmoko et al., 2023). the travel industry, hotel industry, food, finance, spiritual services providing temples, mosques, churches etc., recreation industry, parks ecosystem, health, hospitality, hospitals, sightseeing, handicrafts, toys, leisure and luxury, geographic expeditions, business expeditions etc. Before the

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invention of currency, people exchanged human labor or some goods for other goods during entourage to pay homage.

When inhabitants of one country became more dependent on those of another, and they imported what they needed and exported what they had too much of, money necessarily came into use (Kinley, 2003); it is the invention of money that made travel and tourism easier and diversified. Money, not merely eased exchange but also became an instrument of parking wealth. In the absence of diverse choices, free money is being parked; the equation of exchange $V = \frac{PT}{M_1}$, where V is the velocity of the money, implies V would decrease because the real value of transactions T decreases, decrease in T would weaken the supply over time resulting in into stabilizing price level, therefore V would decrease as free money M_1 with peoples remains constant. Since most forms of tourism are intended to satisfy higher needs of love and belongingness, self-esteem, and self-actualization needs apart from essential needs, viz. biological and physical needs (Maslow, 1943). So huge quantum of tourist expenditures is on satisfying love and belongingness, self-esteem and self-actualization needs. Expenditures on aforementioned higher needs lower his overall parked free money because this expenditure is beyond the expenditures on satisfying essential needs of biological and physical needs, irrespective of whether he makes a tour or not. Consequently, T increases. When the supply of essential commodities at the destination place matches with demand, price level P remains constant. Therefore, V increases provided M_1 remains constant. In case a huge quantity of money arrives from abroad, M_1 will increase Canto (2018), leading to disruption of the equation of exchange. So, in the absence of tourism and growth, the economy is being slashed. However, there are too many tourists at a destination with poor supply side of essential goods and services. In that case, it will result in inflation because too much money is chasing a few goods and services in a reverse situation when few tourists reach to destination and the supply side is strong, then deflation takes place (Sharpley & Telfer, 2014). in such a situation, the price level P would change, making it difficult to ascertain V and real change in revenue.

This paper will investigate, how tourism affects reducing parking of free money, velocity of money, and revenue accrued. This paper will investigate and develop a mathematical model of tourism growth, saturation and its impact on the velocity of money, and find ways to optimize seigniorage revenue.

Some findings about the tourism industry:

1. Tourism is mostly based on satisfying higher needs apart from consumption for survival.
2. Religious faiths are the biggest contributor to sustained tourism, i.e., pilgrimage. However, it is not easy to separate pilgrimage from leisure and holiday tours (Griffin & Raj, 2017).
3. Asia and the Pacific are considered the regions of the world with the greatest number of pilgrims and travelers for religious events, for both international and domestic tourism. According to UNESCO, 60% of the world population practices a religion, and these believers form the demographic base for pilgrimage tourism. Approximately 600 million national and international religious and spiritual pilgrimages take tours each year in the world, of which 40 % take place in Europe and about 50% in Asia (UNWTO, 2012).
4. Growth in the number of tourists at a destination increases the inflow of finances and boosts infrastructure.
5. Boost in infrastructure, leisure and luxury amenities at a tourist site increases tourist visits to a destination. Representing 14.47 percent of the world's population, advanced economies receive

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65 percent of world tourism earnings and create 60.22 percent of world tourism spending (UN WTO, 2010).

6. Wherever pilgrimage, site seeing, ecotourism, etc. are seasonal, during peak season huge influx of money overweighs supply, resulting in inflation, and during lean seasons, there is too much supply for few visitors, so prices of perishable decline, putting locals in jeopardy (Sharpley & Telfer, 2014).
7. If local industries are not in mutualism with tourism, they get destroyed in lean seasons, putting locals in jeopardy (Gal et al., 2010).
8. Despite ample attraction and robust supply side, tourism also depends on the exchange rate of currency, inflation, security at the destination, govt. Taxation policy, visa policy, and overall peace and stability in the region (Sharpley & Telfer, 2014). For example, tourism in the Indian state of Jammu and Kashmir has declined since the growth of militancy in the 1990s. Tourists from developed countries prefer to travel to developing countries, and Indians prefer to go to Nepal, Indonesia etc., due to the favorable exchange rates. However, Indians do not prefer to travel to Pakistan despite the favorable exchange rate due to security and visa-related issues.
9. In convergence theory, tourism is seen as bringing the different economic growth rates in the developed and less developed areas close together. Here, tourism which is directed towards less developed countries or peripheral regions rich in tourist attractions (natural or social and cultural), leads to redistribution of national income to benefit the host destination. As per this theory, tourism redistributes development away from the city center towards regions that have been less developed (Williams & Shaw, 1988).
10. Tourism directly or indirectly provides up to 6-9 % of global employment (UNWTO, 2011).
11. Environmental goods which have no valuation earlier are valuated with the development of tourism.
12. During the first development stage of tourism, also known as Butler's exploration stage Butler (1980), development is spontaneous neither supported by a tourism development policy or intensive capital investment. At this stage average capital-output ratio of the tourism sector is nearly zero, well below the national average.
13. In the second developmental stage number of visitors increases, the tourism business expands, and it is politically supported with investment in infrastructure and superstructure. Due to the time lag between invested input and generated output out of tourism, in this phase capital-output ratio sometimes exceeds the overall economy's average, resulting in slow economic growth.
14. At the third stage of tourism development average tourism capital-output ratio falls. These falls occur due to the benefit of past investment in infrastructure- superstructure being realized, encouraging higher levels of tourism consumption, and contributing to economic growth (Word Bank, 1991).
15. Finance interactively influences tourism, and there exists coupling coordination between finance and tourism (Liao et al., 2018).
16. The coupling degree between the tourism economy and the ecological environment in inner Mongolia has changed from mild in 2012 to medium coupling, despite the lower developing level of the tourism economy vis-à-vis the ecological environment (Liu, 2019).
17. In the case of the huge influx of money from abroad, the velocity of money has three degrees of freedom due to uncontrolled change in P, T and M_1 (Canto, 2018).

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18. As soon as M-Pesa hit the ground in 2009, currency outside the banking system started to decline, and the velocity of money started to decline due to increased financial innovations money multiplier has been rising in Kenya (Ndung'u, 2018).
19. In Canto (2018), Victor A. Canto Andy Wiese has established the equation $\pi = \omega + \mu - \eta + \vartheta$ where π is the inflation rate, ω is the percentage change in the monetary base, μ is the percentage change in the money supplier (supply shifter), η is the income elasticity of the demand for money, ϑ is the elasticity of demand for money with respect to change in the velocity of money (demand shifter). Therefore, if there is a rise in multiplier due to the presence of M-Pesa technologies μ will increase, the influx of money from abroad due to tourism would increase ω, in case govt. Policy could not support growth and development, η would remain stagnant while keeping currency in circulation constant, π would increase, i.e. host country would import inflation if it could not support growth (Sharpley & Telfer, 2014).

METHODS

Mathematical Model. From the above-mentioned findings of various research, there is no mathematical model that could be befitting for the tourism industry. However, Kai-cheng Liao, Ming–Yue Yue in Liao et al. (2018), and Chunling Liu Liu (2019) have studied the coupling relationship between tourism and finance and tourism and ecological environment development, respectively. Both models derive an analogy from the inductor-capacitor coupling theory of physics, which involves just two components usually behaving out of phase. Since tourism is a confederation of industries, so appropriate macroeconomic behavior of tourism cannot be described by knowing its influences with respect to a single constituent. This paper is an attempt to garland influences of each constituent of tourism in a single model and is motivated by Curie-Weis's classical model of paramagnetic substances. As we know, during the first stage of tourism development, visitors come, despite very poor infrastructure at the destination Butler (1980), the capital-output ratio is nearly zero. It is the same as when a magnetizing field H is being applied to a paramagnetic substance; atomic magnetic dipoles begin aligning themselves along the magnetizing field. However, when some atomic magnetic dipoles get aligned, they enforce dipoles in their vicinity to align, leading to further magnetization, shunning out some energy. It could be seen as stage second of tourism Word Bank (1991), where the capital-output ratio is very high, leaving nothing to the host population because to money earned from tourists is being utilized in investing in infrastructure, developing infra, hosts most of the time, also eke it out with the money which they withheld before the arrival of the tourists. Motivated by the above narrative of tourism, define tourism susceptibility χ

$$\chi = \frac{M}{H} = \frac{\alpha(NE + PE + SP)}{R + I}$$

Where H is the total consumption expenditure of tourists at the destination, and M is the induced expenditure by hosts at the destination (this includes investment and consumption expenditures). NE is the natural environment, and the natural environment consists of flora-fauna, rivers, parks, zoos etc. PE is the physical environment, i.e., Roads, Electricity, hospitals, water supply, heritage monuments, Banking and Finance (Haris et al., 2023). SP is the state of policy component, i.e., Exchange rate, political stability of the region, visa policy, and cultural diversity. R is the risk involved while visiting the destination, i.e., theft, robbery, criminal assault, rape, linguistic barrier, and encumbrance. I am the inflation rate at the destination, and α is an adjustable constant.

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The most critical part is to assign numeric values to the components, viz., political stability of the region, visa policy, cultural diversity, theft, robbery, criminal assault, rape, linguistic barrier, and encumbrance. A scheme for assigning numerical values could be put in place, which must reflect the very pattern of tourism at the destination. A model scheme for numerical value estimation of various integrands/ components of tourism is given below in the table-01:

Table 1. State of Policy

S.No.	Component	Description	Range if any	Max. Value
		State of Policy		
1.	Stability of the region	A developed country with a Democratic /authoritarian stable Govt. with a GDP growth rate >2%	HDI>0.7	10/8
		Developing country with Democratic /authoritarian stable Govt. with GDP growth rate >5%	HDI lies in 0.50-0.70	8/6
		Less Developed country Democratic /authoritarian stable Govt. with GDP growth rate >5%	HDI range 0.35-0.50	6/4
		Less Developed country with Democratic /authoritarian stable Govt. with GDP growth rate <5%	HDI range 0.35-0.50	5/3
2.	Visa policy	Visa on arrival/ take less than 15 days/ take more than 15 days	price: high	3/2/1
			price: moderate	5/4/3
			price: low	7/6/5
3.	Cultural Diversity	Religious country with single ethnicity/multiple ethnicity		4/5
		Secular country with single ethnicity/multiple ethnicity		6/9
		Risk Factors		
4	Robbery	Personal robbery	More than 2 /1000 peoples	10
			0 to 2 /1000 persons	10
5	Theft	Larceny theft	More than 15 /1000 peoples	10
			0-15 cases/1000 persons	10
6	Criminal assault	Slapping, pushing, physically attacking Major/minor assault	100/400 per one lac population	15
		Slapping, pushing, physically attacking Major/minor assault	0-100/0-400 per one lac population	15
7	Rape/ sexual assault	Rape includes forceful sexual intercourse, and sexual assault includes stalking, voyeurism, molestation, outraging modesty etc.	>2/>5	12
			Between 0-2 / Between 0-5, per one lac	09

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8.	Linguistic Barrier	Host region people are bilingual with English/ without English skills.		5/10
		Host region people are monolingual with English/ without English skills.		3/9
9.	Encumbrance	Hosts warmly accept outside visitors.		3
		Hosts readily accept outside visitors.		5
		Hosts do not accept outside visitors.		10
10.	Natural Calamities	Highly / Moderately prone to landslide		7/5
		Highly /Moderately prone to cyclone or flood		10/7
		Inflation		
11.	Inflation	Hyperinflation	>20%	200
		Very high inflation	10%<20%	20
		High inflation	0%<10%	10
		Physical Environment		
12.	Roads	All weather metalled road with lighting/ without lighting		10/8
		Seasonal metalled road with lighting/ without lighting		6/4
		All weather unpaved road with lighting/ without lighting		4/2
		Seasonal unpaved road with lighting/ without lighting		3/1
13.	Electricity & Water	The clock Electricity and purified Water supply		10
		Electricity and purified Water supply for fixed hours		05
		Intermittent Electricity and purified Water supply		03
14.	Hospitals	Super specialty Hospitals 2 or more doctors/1000 people		10
		Super specialty Hospitals with more than one less than 2 doctors/1000 people		08
		Ordinary hospitals 2 or more doctors/1000 people		05
		Ordinary hospitals with less than 2 doctors/1000 people		05
		First referral hospital only with 2 or more doctors/1000 people		02
		First referral hospital less than 2 doctors/1000 people		02
15.	Heritage Monuments	UNESCO world heritage sites, Museums or internationally important pilgrimage sites, e.g., Mecca, Jerusalem etc.		10
		Heritage sites, Museums, and pilgrimage sites of National importance only.		07
		Heritage sites, Museums, and pilgrimage sites of Regional importance only.		04

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16.	Banking and Finance	Core banking facility with/without foreign exchange facility.	More than 30 Bank branches/100000 people.	10/07
		Core banking facility with/without foreign exchange facility.	01 to 30 Banks Branch /100000 people or more.	10/07
		Natural Environment		
17.	Flora-Fauna	Internationally recognized biodiversity hot spot under Cartagena protocol		10
		Biosphere reserve		07
		National parks, wildlife sanctuaries, game sanctuaries of national importance		05
		Other Natural green covers and zoos are recognized for recreation or meditation.		03
18.	Rivers, Bogs and Lakes	Bogs and Lakes under RAMSAR convention, or Navigable rivers suitable for adventure sports of rafting, roving and surfing		07
		Other clean Bogs, Lakes and rivers whose banks are clean and green are suitable for trekking and navigation.		04

RESULT AND DISCUSSION

Assigning Numerical Value to a Component. Suppose we want to calculate χ for the renowned pilgrimage site of Hindus Badrinath Dham; for this site, NE=03 (it has pristine meditation centers only), PE= 20 (it has poor banking and finance facility, pilgrimage site of national importance, First referral unit of the hospital, Seasonal metalled road without lighting, Intermittent Electricity & Purified Water supply), I=15 (Due to poor supply of goods inflation is very high), R=27 (High landslide and cloud burst prone, Host region peoples are monolingual without English skills, Moderate encumbrance due to tribal set up, Low crime prone), SP=20 (Developing country with Democratic, stable Govt. with GDP growth rate >5%, Visa processing take more than 15 days with a moderate fee, Secular country with single multiple ethnicities). Therefore, we have;

$$\frac{NE + PE + SP}{R + I} = \frac{03 + 20 + 20}{27 + 15} = 1.075$$

Assuming α to be unity (though it has to be determined once by estimating M, H depending upon stages of tourism development), we have χ=1.075, So the host population will invest 1.075 times what tourists payout to them towards inventory gain. So, the monetary value of the total economic activity is 1.075 times the expenditures by the tourists.

How to calculate the numerical value of a component? Let us take a constituent in Risk factor, personal robbery; suppose the incidence of a personal robbery at the host destination is 1.55/ 1000 people. Then, the corresponding numerical value could be assigned as

$$\frac{\text{Observed values Max. Value}}{\text{Lenth of interval}} = \frac{1.55X10}{2} = 7.75$$

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In the case of components pertaining to natural environments, the numerical value could be assigned as

$$\frac{\text{Entry fee of concerned heritage site } \mathbf{X} \text{ Max. Value of assigned to component}}{\text{Average entry fee of regions 10 UNESCO world heritage sites/5 RAMSAR sites}}$$

If it is a religious site where no entry fee is being charged, assign it maximum value.

Velocity of Money when Tourism Persists. Consider T=$[x_1 \quad x_2 \quad x_3 \cdots \quad x_n$ where x_i, 1≤i≤n is the amount of transaction of ith commodity and n is the total number of commodities undergoing transaction during the assessment period P=$[p_1 \quad p_2 \quad p_3 \cdots \quad p_n]$, where p_i, 1≤i≤n is the price of the ith commodity, then the velocity of money is

$$V = \frac{PT^t}{M_1}$$

Here, T^t is a transpose matrix of T, V is the velocity of money, *and* M_1 is nominal money under circulation. In the presence of tourism, certain things are valued that were not valued in the absence of tourism, viz heritage sites, parks, bogs, lakes etc., and certain economic activities get enhanced in the presence of tourism, viz hospitals, travel, hotels, etc. Now enlist them as a case.

i. When tourism is absent, Transaction matrix T=$[x_1 \quad x_2 \quad x_3 \cdots \quad x_n]$
When tourism is absent, Price matrix
P= $[p_1 \quad p_2 \quad p_3 \cdots \quad p_n]$

ii. When tourism is present, Transaction matrix T=$[h_1 \quad h_2 \quad \ldots \quad h_k \, x_1 \quad x_2 \ldots \quad x_m \, x_{m+1} \cdots \quad x_n$ where x_i, 1≤i≤n. When tourism is present, the corresponding price matrix could be given as P=$[\rho_1 \quad \rho_2 \quad \ldots \quad \rho_n \, p_1 \quad p_2 \ldots \quad p_m \, p_{m+1} \cdots \quad p_n]$
Where commodities transaction submatrix
H= $[h_1 \quad h_2 \quad \ldots \quad h_k]$ pertains to higher needs in Maslow's hierarchy of needs Maslow (1943), and matrix **ρ**= $[\rho_1 \quad \rho_2 \quad \ldots \quad \rho_n]$is the corresponding submatrix. Commodities transaction submatrix E= $[x_1 \; x_2 \ldots x_m]$ corresponding price matrix ƥ =$[p_1 \, p_2 \ldots p_m]$

represents commodities related to enhanced economic activities. So velocity of money in the presence of tourism V_t is given by

$$V_t = \frac{\rho H^t}{M_1} + \frac{ƥ E^t}{M_1} + \frac{P_r T_r^t}{M_1}$$

Where Pr, T_r^t are the remaining price and transaction submatrix. If V is the velocity of money in the absence of tourism. Then

$$V_t - V = \frac{\rho H^t}{M_1} + \left(\frac{ƥ \mathbf{E^t}}{M_1} - \frac{ƥ E^t}{M_1}\right)$$

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Where $\eth, \mathrm{E}^t$ is the corresponding submatrix for $\eth, \mathbf{E}^t$ when there is no tourism. (i) if there is only intra-national tourism $\frac{\rho \mathrm{H}^t}{M_1} \geq 0$ and $\left(\frac{\eth \mathbf{E}^t}{M_1} - \frac{\eth \mathrm{E}^t}{M_1}\right) \geq 0$ (ii) if only outbound international tourism exists, then $[\![\frac{\rho \mathrm{H}^t}{M_1} \leq 0$ and $\left(\frac{\eth \mathbf{E}^t}{M_1} - \frac{\eth \mathrm{E}^t}{M_1}\right) \leq 0$, (iii) usually is $\left(\frac{\eth \mathbf{E}^t}{M_1} - \frac{\eth \mathrm{E}^t}{M_1}\right) \geq 0$ and if too many pilgrims going to pay homage to pilgrimage site or heritage site or nature tourism, out of country then $\frac{\rho \mathrm{H}^t}{M_1} \leq 0$ (Mostly Muslims from Pakistan and India visit Mecca and Madina in Arab but very few from Arab visit Pakistan or India), revere scenario is, few are leaving country and more are coming in, then $\frac{\rho \mathrm{H}^t}{M_1} \geq 0$

Velocity of Money in Relation to Tourism and Employment. Since the component $\frac{\rho \mathrm{H}^t}{M_1}$ represents the sector responsible for generating employment in the services sector, the only cost involved is one-time development and maintenance. So, when $\frac{\rho \mathrm{H}^t}{M_1} \leq 0,$ jobs in the host country get lost. That is why, in the competitive tourism market, countries must adopt lucrative visa pricing and processing in SP components, apart from improving NE and PE.

Seigniorage Revenue. Since the growth of tourism infuses the money supply, leading to inflation, it may make the living of hosts who are not a party to the tourism business costlier and miserable. Let us suppose P be the average price of all the goods and services under the transaction, then $\mathrm{P}\sum_{i=0}^{n} x_i = PT^t$, taking log on both sides.

$$\frac{\partial \mathrm{P}}{\mathrm{P}} + \frac{\partial \sum_{i=0}^{n} x_i}{\sum_{i=0}^{n} x_i} = \frac{\partial PT^t}{PT^t}$$

Where $\frac{\partial \mathrm{P}}{\mathrm{P}}$ is the inflation rate, $\frac{\partial \sum_{i=0}^{n} x_i}{\sum_{i=0}^{n} x_i}$ is the percentage change in the production of goods and services, $\frac{\partial and\ PT^t}{PT^t}$ is the percentage change in GDP of the host destination. For the accounting effect of Tourism only, we can take $\partial PT^t = \chi H$ (revenue earned due to tourism) and $\partial \sum_{i=0}^{n} x_i = \sum_{i=0}^{m} \mathrm{x_i} - \sum_{i=0}^{m} x_i$. Therefore, tourism-induced inflation could be estimated as

$$\frac{\partial \mathrm{P}}{\mathrm{P}} = \frac{\chi H}{GDP} - \frac{\sum_{i=0}^{m} \mathrm{x_i} - \sum_{i=0}^{m} x_i}{\sum_{i=0}^{n} x_i}$$

Compare this formula for inflation with one given by Victor A. Canto Andy Wiese in Canto (2018), here money multiplier effect by Njuguna Ndungu in Ndung'u (2018) is reflected in the tourism susceptibility χ, if the monetary base of money in circulation, i.e., M_1 being kept fixed then real change in the GDP due to tourism is $\chi H - \pi \chi H$, where

$$\pi = \frac{\chi H}{GDP} - \frac{\sum_{i=0}^{m} \mathrm{x_i} - \sum_{i=0}^{m} x_i}{\sum_{i=0}^{n} x_i}$$

Therefore the seigniorage revenue of tourism could be given by

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$$\chi H - \pi\chi H = \chi H\left\{1 - \left(\frac{\chi H}{GDP} - \frac{\sum_{i=0}^{m} x_i - \sum_{i=0}^{m} x_i}{\sum_{i=0}^{n} x_i}\right)\right\}.$$

Effective change in the velocity of money due to the presence of tourism could be revised to

$$V_t - V = \frac{\rho H^t}{M_1} + \left(\frac{\beta E^t}{M_1} - \frac{\beta E^t}{M_1}\right) - \frac{\chi H\left(\frac{\chi H}{GDP} - \frac{\sum_{i=0}^{m} x_i - \sum_{i=0}^{m} x_i}{\sum_{i=0}^{n} x_i}\right)}{M_1}$$

or

$$V_t - V = \frac{\chi H\left\{1 - \left(\frac{\chi H}{GDP} - \frac{\sum_{i=0}^{m} x_i - \sum_{i=0}^{m} x_i}{\sum_{i=0}^{n} x_i}\right)\right\}}{M_1}$$

Where $\chi = \frac{\alpha(NE+PE+SP)}{R+I}$ could estimated easily by estimating the numerical values of each component from Table-01 and applying formulas from equations (2) and (3) wherever necessary.

Limitations.

1. The maximum values assigned to a component in table-01 are being taken intuitively, so they ought to be assigned by thorough social research.
2. There might be some tourism affective components and factors that are missing, which ought to be included in order to achieve accuracy.
3. Tourism susceptibility constant α could not be a fixed number; it should be adjusted when the tourism industry transits from development stage I to III.
4. Estimating H, i.e., total expenses of tourism, is a cumbersome task.

Discussions.

1. From equation (11), if $\left(\frac{\chi H}{GDP} - \frac{\sum_{i=0}^{m} x_i - \sum_{i=0}^{m} x_i}{\sum_{i=0}^{n} x_i}\right)$ is high, then real growth in velocity of money is much less; it may be zero also, but this factor is very high if tourism susceptibility χ is very high and supply of From tourism From related From essential From goods From and From services From are From observing From very slow growth i.e. $\frac{\sum_{i=0}^{m} x_i - \sum_{i=0}^{m} x_i}{\sum_{i=0}^{n} x_i}$ is very small. That is, if the destination has enough tourist attractions but cannot support tourists well with man and material, then inflation would be very high, due to which velocity of money may remain unaffected as happens in the stage-I of tourism development, i.e., Butler's exploration stage (Butler, 1980).
2. When tourism grows, $\frac{\sum_{i=0}^{m} x_i - \sum_{i=0}^{m} x_i}{\sum_{i=0}^{n} x_i}$ too grows gradually, and $\left(\frac{\chi H}{GDP} - \frac{\sum_{i=0}^{m} x_i - \sum_{i=0}^{m} x_i}{\sum_{i=0}^{n} x_i}\right)$ decreases. Hence, the velocity of money increases gradually. However, hosts use the money earned on the investment of improving amenities, goods and services, i.e., in improving $\frac{\sum_{i=0}^{m} x_i - \sum_{i=0}^{m} x_i}{\sum_{i=0}^{n} x_i}$ capital-output ratio remains very high, there is hardly any improvement in the consumption expenditure. During this phase, stage II of tourism development is realized.

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3. When $\frac{\sum_{i=0}^{m} x_i - \sum_{i=0}^{m} x_i}{\sum_{i=0}^{n} x_i}$ grows to the optimum level, $\left(\frac{\chi H}{GDP} - \frac{\sum_{i=0}^{m} x_i - \sum_{i=0}^{m} x_i}{\sum_{i=0}^{n} x_i}\right)$, stage-III of tourism development Word Bank (1991) is realized, now hosts have more earning and less pressure for basic infrastructure development, so their consumption expenditure increases and $\frac{\sum_{i=0}^{m} x_i - \sum_{i=0}^{m} x_i}{\sum_{i=0}^{n} x_i}$ remains very high.

CONCLUSION

Higher tourism susceptibility χ, i.e., higher scores of NE, PE and SP and lower scores of I and R, increases tourism susceptibility, hence the development potential of the destination. However high score of NE, a poor score of PE and SP and an overall high score of χ, may put hosts in distress conditions due to very high inflation and crashing life support system, i.e., $\left(\frac{\chi H}{GDP} - \frac{\sum_{i=0}^{m} x_i - \sum_{i=0}^{m} x_i}{\sum_{i=0}^{n} x_i}\right) \to 1$, this usually happens in the State of Uttarakhand India during summers. Before the onset of the monsoon threat, this was a hilly state endowed with lush green temperate and subtropical and canopy forests, being relatively cooler. In order to get rid of the hot waves in the northern plains of India huge number of foreigners and people from the plains moved into this hill state, but due to poor roads, hospitals, and other life support services and being in landslide and earthquake-prone zones put the local peoples not engaged in tourism in jeopardy, here there is no support system to enhance $\frac{\sum_{i=0}^{m} x_i - \sum_{i=0}^{m} x_i}{\sum_{i=0}^{n} x_i}$ which matches with H. Though a high score of χ reflects the attractiveness of the destination, it does not assure well well-being of either tourists or hosts until a score of PE is also high. This model is the first of its kind; once we could judiciously assign max. Values in Table 01 could help in managing tourism efficiently and effectively; this could also provide insight into how to develop tourism at a destination while improving the natural environment (de Rozari et al., 2024).

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