IJCRT.ORG ISSN : 2320-2882
INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)
An International Open Access, Peer-reviewed, Refereed Journal

Vedic Sanskar (D-Impaction) Model

The Characterization of Moral Standard of Human Beings on the Basis of Sanskars and Kusanskars

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Abstract: The Model is related to human character development problem, which shows the effective change in moral nature of human beings due to sanskars and Kusanskars. The term Sanskar is a precious ornament of mankind. The effective moral standards have been investigated according to the standards of sanskars and kusanskars. The model is continuous time model and performs according to human performance, depending upon the accuracy of values D_s (standard of Sanskars) and D_k (standard of Kusanskars). The existence of Sanskars in human beings makes them great. Two applications, one in industry and other in environment, are provided to illustrate the validity of the model with theoretical estimates by describing the significance of D-factor D_{sk}.

Index Terms: Sanskars & Kusanskars, Moral Standard, Effective Productivity & Load Factor, Effective Exponential Model, Effective Change.

Nomenclature

$S(t)$	The Effective Moral Standard of a human at time t
D_s	The rate of flow of Sanskars per unit time
D_k	The rate of flow of Kusanskars per unit time
$\lvert D_s - D_k \rvert$	The effective difference
D_{sk}	D-factor, known as the effective Karmaphalansh or the effective part of fate (Karmashaya)
Karmaphalansh	Part of the fruit of karma!
Karmashaya	The result of the actions of previous births i.e. fate

I. Introduction

Vedic culture and civilization is the oldest, best and eternal system of human beings. In the Vedas, there is a law of sixteen Sanskars for human beings from pregnancy till death. The main reason for the creation of the universe by God is the enjoyment of the fruits of the actions of the living beings. That is, this world is for the enjoyment of beings. Because-

"Avashyameva bhoktavyam kritam karma shubhashubham"
"अवश्यमेव भोक्तव्यं कृतम् कर्म शुभाऽशुभम् /" [5, 7, 8, 13-16, 18, 21, 25, 29]

That is, one has to bear the fruits of good and bad deeds done.
, and

"Nabhuktam kshiyate karma kalpakotishatairpi"
"नाभुक्तं क्षीयते कर्म कल्पकोटिशतैरपि /" [3, 7, 8, 19]

That is, those actions are never destroyed without giving fruit. That is why living beings have to go through the cycle of birth and death continuously.

The word Sanskar is made up of two words: — Sam and Kar. Sam means Samyak i.e. best. The meaning of the kar is the work or deed. Sanskar is a word of Sanskrit language, which means - the law or process of making a person / thing suitable by purifying or Sanskrit i.e. purification. To make, an ordinary or deformed thing better by special actions. Similarly, making an ordinary man superior by special religious rituals is said to be cultured. The Upanayana ceremony has special significance among the sixteen sacraments in which the children enter the celibate ashram. Purification of mind, word, deed and body is called sacrament. Sanskars keep man away from sin and ignorance and unite him with ethics and knowledge [3].

By Upanishads,

"Aum purnamadah purnamidam, purnatpurnamudachyate. purnasya purnamadaya, purnamevavasishyate."
"ओ३म् पूर्णमदः पूर्णमिदं, पूर्णात्पूर्णमुदच्यते। पूर्णस्यपूर्णमादाय, पूर्णमेवावशिष्यते।।"[2]

That is, that God is perfect. This visible world is also completely complete in self. From the Supreme Personality of Godhead, this whole world emerges. Even when the Supreme-Supreme Personality of Godhead is taken as the perfect form, the eternally glorious Lord remains perfect everywhere. It would never break. We should worship the same God, never another.

How do we evaluate? Since, The Eternal Vedic Laws, flowing from immemorial time, are fully responsible for the all-round development of human beings in building the human character, therefore, assessment should be based on all round development i.e. physical, mental, intellectual and spiritual development. Evaluation should be fair and transparent to maintain accuracy.

II. METHODOLOGY

2.1 Mathematical Modeling

Mathematical modeling performs a wide role in real life situations occurring in the visible or non-visible world in view of importance in biology, economics, sociology, engineering etc. Now, to establish concerned human character development problem mathematically, we are dealing with mathematical modeling. The input-output compartmental diagram and the word equation describing a changing moral standard of a human [27] are shown in Fig. 1 and Fig. 2 respectively.

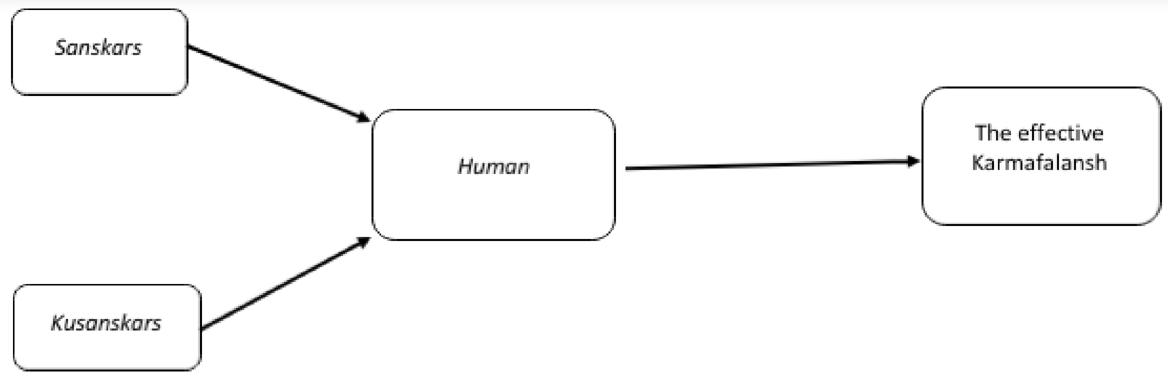

Fig. 1: Input-Output compartmental diagram for the effective moral standard.

Fig. 2: The word equation for sketched compartmental model describing a change in the effective moral standard.

By well-known population growth model [21, 27],

$$S(t + \Delta t) - S(t) = [D_s\, S(t) - D_k\, S(t)]\, \Delta t + O(\Delta t)$$

, where O(Δt) denotes the other terms of Δt, power greater than or equal to two.

$$\frac{S(t + \Delta t) - S(t)}{\Delta t} = [D_s\, S(t) - D_k S(t)] + O'(\Delta t)$$

Taking limit as $\Delta t \to 0$, we have

$$\frac{dS}{dt} = (D_s - D_k)\, S \qquad \dots\dots\dots (1)$$

, such that

$$D_s + D_k = 100\ \% \qquad \dots\dots\dots\dots (2)$$

(Total value without error in evaluation must be equal to the sum of Sanskars and Kusanskars)

, where D_s, D_k are such that

$$0 < D_s \leq 100 \text{ and } 0 < D_k \leq 100 \text{ (in \%)} \qquad \ldots\ldots\ldots (3)$$

Obviously, the change $\frac{dS}{dt}$ in the effective moral standard S over time t is equal to the product of the difference in Sanskars and Kusanskars and moral standard, as the moral standard S(t) of living beings depends on time t.
Now, Eq. 1 is of first order and first degree ordinary differential equation. Its solution [1, 10] is given as follows:

$$S(t) = D_{sk}\, e^{(D_s - D_k)t}\ ;\ t \geq 0 \qquad \ldots\ldots\ldots (4)$$

, where, D_{sk} is the integral constant or constant of integration.

2.2 Model Assumptions

Possibly in the universe, Sanskars and Kusanskars can neither be equal to 0% nor 100%, that is, both are always present together. 0% can be said to be poor and 100% as excellent condition. Furthermore,

- **i.** For $D_{sk} = 0$, We have S = 0, which is impossible in the universe because the world is meant for the enjoyment of the living beings and the result of the accumulated karmas of the previous birth is necessary for the enjoyment in the next life. Hence, S will be non-zero. t is the time which will always be positive i.e. t > 0, because life and age are fixed. That's why t can never be infinite.
- **ii.** For $D_{sk} < 0$, we have S < 0, because the exponential function is always positive. But this is impossible as the positive result of karma is Karmashaya. Hence, S will always be greater than zero i.e. S > 0, then $D_{sk} > 0$, always.
- **iii.** For $D_{sk} \to +\infty$, S will be infinite, since $e^{(D_s - D_k)t} > 0;\ t \geq 0$ which is impossible because in this creation no one can be perfect except God [2].

2.3 Computational Investigation

Since $D_{sk} > 0$ i.e. that positive value of D_{sk}, that represents the effective part of Karmashaya. So, we define $D_{sk} > 0$ such that

$$D_{sk} = \left|\frac{D_s - D_k}{D_s + D_k}\right| = \left|\frac{D_s - D_k}{100}\right| = |D_s - D_k|\ \% \qquad \ldots\ldots\ldots (5)$$

Now, from Eq. 3 & Eq. 4, we have

$$S = D_{sk}\, e^{(D_s - D_k)t}\ ;\ t \geq 0 \qquad \ldots\ldots\ldots (6)$$

Finally, for $t \geq 0$ and $0 < D_{sk} \leq 1$, we have
, when $D_s > D_k$

$$S = D_{sk}\, e^{(D_s - D_k)t} \qquad \ldots\ldots\ldots (7)$$

, and when $D_s < D_k$

$$S = D_{sk}\, e^{-(D_s - D_k)t} \qquad \ldots\ldots\ldots (8)$$

The value of S depends on time t as well as the constants D_s, D_k as the constants change at a particular time, but D_s, D_k is not functionally dependent on time because their value is based on the evaluation process which may or may not be transformed into beings with the passage of time. Therefore, the following cases arise:

- **When $D_s > D_k$,** then D_{sk} shows the dominance of Sanskars in life or excess of virtuous deeds i.e. cultured life. Human beings will only attain salvation or be inclined towards salvation. Because only human beings have this power, other beings have their own very limited power. In this situation, there is a rapid exponential growth in the Sanskars. That is why it is called the Fast (Rapid) Sanskar model.

- **When$D_s < D_k$,** then D_{sk} shows the dominance of Kuanskars in life or the excess of sinful deeds i.e. malnourished life. Human beings will only get or will be prone to degradation. Other than human beings, living in their being under the arrangement of God, always do charity. Possibly, other beings remain progressive till the attainment of human life. In this situation, there is an exponential reduction in the Sanskars. That is why it is called the Slow Sanskar model.

- **At $t = 0$,** we have $S = D_{sk} = |D_s - D_k|\%$ (the effective Karmaphalansh or the effective part of fate). The time between the soul leaving the body and its reintegration, that is, the time before the micro-organism enters the gross body. Initially, there always exists an output.

- **When $D_s = D_k$,** then $S = 0$, that is, in this situation, evaluation can be possible only momentarily, not in any particular aspect, because birth and death is a gradual continuous process which never ends. So, at any instant, $t = t_c$ (critical time) $S_c = 0$; where $D_s = D_k$. So, $D_s \neq D_k$; for every t, excepting $t = t_c$. But this is not possible in the real world. In real creation, $D_s \neq D_k$; for every t.

- **When $D_s = m\, D_k$,** then the Sanskars will be m times more effective than the Kusanskars.

- **When $D_k = n\, D_s$,** then the Kusanskars will be n times more effective than the Sanskars.

- Generally, milk consists of 85% water and the rest of the solids are minerals and fats. When cheese is made from milk, both the solid and water get separated. After that they do not join again i.e. they cannot regain their form. Similarly, though the nature of sin and virtue are one, they are separate.

- Since, $e^t > 0; t > 0, e^0 = 1$ and e^t is an increasing function, so $e^{(t/n)} \to 1$, when $n \to \infty$ (extremely large number); $t > 0$. Therefore,

$$e^{(1/n)}, e^{(2/n)}, e^{(3/n)}, \dots\dots\dots, e^{(t/n)} > e^0 = 1;\ t > 0$$

, n is a natural number. Now,

i. **When $\mathbf{D_k = 0}$,** then $S = e^{D_s t}$; t ≥ 0 and here D_k does not appear, so, this is called the Complete/Ideal/Best/Non-degenerate Sanskar Model. If D_{sk} such that

$$D_{sk} > e^{-(D_s - D_k)t}$$

, that is,

$$D_{sk}\, e^{(D_s - D_k)t} > 1 \Rightarrow S > 1$$

Then, the model would be in favor of Sanskars.

ii. **When $\mathbf{D_s = 0}$,** then $S = e^{-D_k t}$; t ≥ 0 and here D_s does not appear, so, this is called the Incomplete/Real/Immense/Degenerate Sanskar Model. If D_{sk} such that

$D_{sk} < e^{-(D_s - D_k)t}$,

, that is

$$D_{sk}\, e^{(D_s - D_k)t} < 1 \Rightarrow S < 1$$

Then, the model would be in favor of Kusanskars.

- **Remarks**

1) As $D_s + D_k = 100\%$, so the following expressions can also be written as :

$$S = e^{D_s t} = e^{(100 - D_k)t};\ \mathrm{t} \geq 0$$

, and

$$S = e^{-D_k t} = e^{-(100 - D_s)t};\ \mathrm{t} \geq 0$$

Apply these when sum $D_s + D_k$ and opponent constants of model are given, that is, D_k & D_s are given respectively.

2) D-Impaction Model is the pure, that is, error free model in the sense of accuracy of determination of values of D_s & D_k.

III. Applications

Here, we would like to discuss two more applications as follows:

3.1 In Industry

We know that raw material is not always completely converted into product at the time of production. So, assume that the total production is equal to the total raw material that is total availability. Suppose that,

D_p = The production rate per unit time

D_w = The product wastage rate per unit time

Then,

$D_p + D_w = 100\%$ (Rate of consumed raw material per unit time)

, where D_p and D_w are in percent.

It follows by the D-Impaction Model that the effective productivity in time t,

$$P(t) = D_{pw}\, e^{(D_p - D_w)t}; t \geq 0$$

Now, there are three cases arise:

1) If $D_p = D_w$, then $P(t) = 0$ implies that exactly half of the material is converted to the product.

2) If $D_p > D_w$, then the model is in the favor of production.

3) If $D_p < D_w$, then the model is in the favor of production wastage.

3.2 In Environment

Nitrogen, a component of proteins and nucleic acids, is essential to life on Earth [18].

Suppose that,

D_N = The rate of production of Nitrogen in the atmosphere per unit time

D_R = The rate of production of residue of other gases in the atmosphere per unit time

, such that

$D_N + D_R = 100\%$ (Rate of consumed raw material per unit time)

, where, D_N and D_R are in percent.
It follows by the D-Impaction Model that the effective productivity in time t,

$$P(t) = D_{NR}\, e^{(D_N - D_R)t}; t \geq 0$$

Now, there are three cases arise:

1) If $D_N = D_R$, then $P(t) = 0$ implies that exactly half of the material is converted to Nitrogen.
2) If $D_N > D_R$, then the model is in the favor of Nitrogen.
(Although 78 % by volume of the atmosphere is nitrogen gas, this abundant reservoir exists in a form unusable by most organisms [11, 17]. Nitrogen fixation, in which nitrogen gas is converted into inorganic nitrogen compounds, is mostly (90 percent) accomplished by certain bacteria and blue-green algae [17].)
3) If $D_N < D_R$, then the model is in the favor residue of other gases.
(Since, nitrogen use efficiency is typically less than 50% [23], farm runoff from heavy use of fixed industrial nitrogen disrupts biological habitats [5, 26]. Nearly 50% of the nitrogen found in human tissues originated from the Haber–Bosch process [24], all are contained in [11] also. Under normal conditions, that is, at one atmosphere pressure, the total Nitrogen content of the human body is usually estimated as being about 1000 c.c., nearly half of this being present in the fatty tissues [20]. Recently Burns [4] gave the following figures for nitrogen content of a man Of 70 kg.: blood, 30 c.c.; fat, 530 c.c.; bone, 0 c.c.; residue, 435 c.c.; with a total of 995 c.c.)

IV. SIGNIFICANCE OF D-FACTOR D_{sk}

4.1 Effective Passenger Load Factor

In transport industry, consider that on a particular day n trains are scheduled by a railway, each of which travels m kilometer with capacity of k seats [12]. Then,

$$\text{Effective Passenger Load factor } D_{sk} = \left|\frac{D_s - D_k}{D_s + D_k}\right|$$

, where

D_s = [Number of trains (n)][Distance (m) KM/Train][Sold tickets or booked seats]
D_k = [Number of trains (n)][Distance, m KM/Train][Available seats]

, such that

$D_s + D_k$ = [Number of trains (n)][Distance (m) KM/Train][Total no. of seats (k)]

For example, let Total no. of seats = 1000 and sold tickets = 700, then

$$\text{Effective Passenger Load factor } D_{sk} = \left|\frac{D_s - D_k}{D_s + D_k}\right| = \left|\frac{700 - (1000 - 700)}{1000}\right| = \frac{400}{1000} = 0.4$$

4.2 In Electronics

There are some basic factors dealing with electrical engineering, can be characterized by D-factor D_{sk} as follows [9]:

4.2.1 Effective Demand Factor

$$\text{Effective demand factor } D_{sk} = \left|\frac{D_s - D_k}{D_s + D_k}\right|$$

, where

D_s = Maximum demand of a system
D_k = Relative difference = Total connected load on the system$-D_s$

For example, let Maximum demand of a system = 3000W, Total connected load on the system = 5000W, then

$$\text{Effective demand factor } D_{sk} = \left|\frac{D_s - D_k}{D_s + D_k}\right| = \left|\frac{3000 - (5000 - 3000)}{5000}\right| = \frac{1000}{5000} = 0.2$$

4.2.2 Effective Diversity or Simultaneity Factor

Define

$$D_{sk} = \left|\frac{D_s - D_k}{D_s + D_k}\right|$$

, where

D_s = Sum of individual maximum demands
D_k = Relative difference = Maximum demand on power station$-D_s$

Generally, sum of individual maximum demand is always greater than maximum demand on power station. Hence, the effective diversity Factor can be defined by the reciprocal of D_{sk} and denoted by D_{edf} as follows:

$$\text{Effective diversity factor } D_{edf} = \frac{1}{D_{sk}} = \left|\frac{D_s + D_k}{D_s - D_k}\right|$$

For example, consider a power sub-station with maximum demand 50KW serves 10 houses, each of which has maximum demand 7KW. Then, D_s = 7*10 = 70KW and D_k = 50 - 70 = - 20, we have

$$\text{Effective diversity factor } D_{edf} = \frac{1}{D_{sk}} = \left|\frac{D_s + D_k}{D_s - D_k}\right| = \left|\frac{50}{70 - (50 - 70)}\right| = \frac{50}{90} = 0.55$$

4.2.3 Effective Load Factor

$$\text{Effective load factor } D_{sk} = \left|\frac{D_s - D_k}{D_s + D_k}\right|$$

, where

D_s = Average load

D_k = Relative difference = Maximum load during the given period$-D_s$

For example, consider a motor of 30HP derives a constant 20HP load during on mode. Then,

$$\text{Effective load factor } D_{sk} = \left|\frac{D_s - D_k}{D_s + D_k}\right| = \left|\frac{20 - (30 - 20)}{30}\right| = \frac{10}{30} = 0.33$$

4.2.4 Effective Utilization Factor

$$\text{Effective utilization factor } D_{sk} = \left|\frac{D_s - D_k}{D_s + D_k}\right|$$

, where

D_s = The time that the equipment is in use

D_k = Relative difference = Total time that it could be in use$-D_s$

For example, consider a motor works 1000 hours of operation in a year. Then, for a base of 5000 hours per year,

$$\text{Effective utilization factor } D_{sk} = \left|\frac{D_s - D_k}{D_s + D_k}\right| = \left|\frac{1000 - (5000 - 1000)}{5000}\right| = \frac{3000}{5000} = 0.6$$

4.2.5 Effective Coincidence Factor

$$\text{Effective coincidence factor } D_{sk} = \left|\frac{D_s - D_k}{D_s + D_k}\right|$$

, where

D_s = Maximum demand on power station

D_k = Relative difference = Sum of individual maximum demands$-D_s$

For example, consider a power sub-station with maximum demand 50KW serves 10 houses, each of which has maximum demand 7KW. Then, $D_s = 7 \times 10 = 70$ KW and $D_k = 70 - 50 = 20$ KW, we have

$$\text{Effective coincidence factor } D_{sk} = \left|\frac{D_s - D_k}{D_s + D_k}\right| = \left|\frac{50 - (70 - 50)}{70}\right| = \frac{30}{70} = 0.43$$

4.2.6 Division Into Two Parts

If any quantity is divided into two parts D_s and D_k such that D_s+D_k = 100%. Then, the effective division factor is given by D_{sk}.

4.2.7 Benefits/Advantages

Most of the changes in this world can be expressed in either linear or exponential form. For example, linear changes like physical growth in plants and animals, while natural resources (food, water etc.), changes in the number of microorganisms, divine disasters (epidemics, forest fires etc.), physical changes (cold-heat, hunger-thirst etc.) etc. are the possible exponential changes. Through this model, the effective change due to profit-loss, growth-decay and mutual exponential change of other two parameters can be expressed mathematically. Moreover, the model can be applied in population change, economy change, climate change, etc.

V. Results And Discussion

5.1 Characterization

Now, from Eq.6, we have

$$\frac{dS}{dt} = D_{sk}(D_s - D_k)\, e^{(D_s - D_k)t}\ ;\ t \geq 0$$

, then $\frac{dS}{dt} > 0$, for $D_s > D_k \Rightarrow$ S is increasing and $\frac{dS}{dt} < 0$, for $D_s < D_k \Rightarrow$ S is decreasing.

Obviously,

$\frac{dS}{dt} = 0 \Rightarrow D_s = D_k$ is the critical (stationary) point for S. Also,

$$\frac{d^2S}{dt^2} = D_{sk}(D_s - D_k)^2 \, e^{(D_s - D_k)t} \text{ ; } t \geq 0$$

, then $\frac{d^2S}{dt^2} > 0$, for both $D_s > D_k$ and $D_s < D_k$. Hence, for $D_s > D_k$, S increases at $D_s = D_k$ on $t \in [0, \infty)$ and has the minima $S(0) = D_{sk}$ at $D_s = D_k$. Similarly, for $D_s < D_k$, S decreases at $D_s = D_k$ on $t \in [0, \infty)$ and has the maxima $S(0) = D_{sk}$ at $D_s = D_k$.

For the exceptional case, at critical time, for which $D_s = D_k$, $\frac{d^2S}{dt^2} = 0 \Rightarrow D_s = D_k$ is the point of inflection of $S(t)$.

5.2 Graphical Representation

Here, we are discussing some particular cases separately for both Sanskars and Kusanskars by sketching graphs using MATLAB. Consider the following two cases:

5.2.1 Case I: $D_s > D_k$ (In Favor Of Sanskars)

In this case, the effective moral standard remains in favor of Sanskars and increases according as increase in Sanskars. To validate theoretical estimates, Fig. 3 provides us a graph for the following particular possibilities:

i. $D_s = 60\%, D_k = 40\%, S = \frac{1}{5}e^{\left(\frac{1}{5}t\right)}$ **ii.** $D_s = 70\%, D_k = 30\%, S = \frac{2}{5}e^{\left(\frac{2}{5}t\right)}$

iii. $D_s = 80\%, D_k = 20\%, S = \frac{3}{5}e^{\left(\frac{3}{5}t\right)}$ **iv.** $D_s = 90\%, D_k = 10\%, S = \frac{4}{5}e^{\left(\frac{4}{5}t\right)}$

v. $D_s = 100\%, D_k = 0\%, S = e^t$

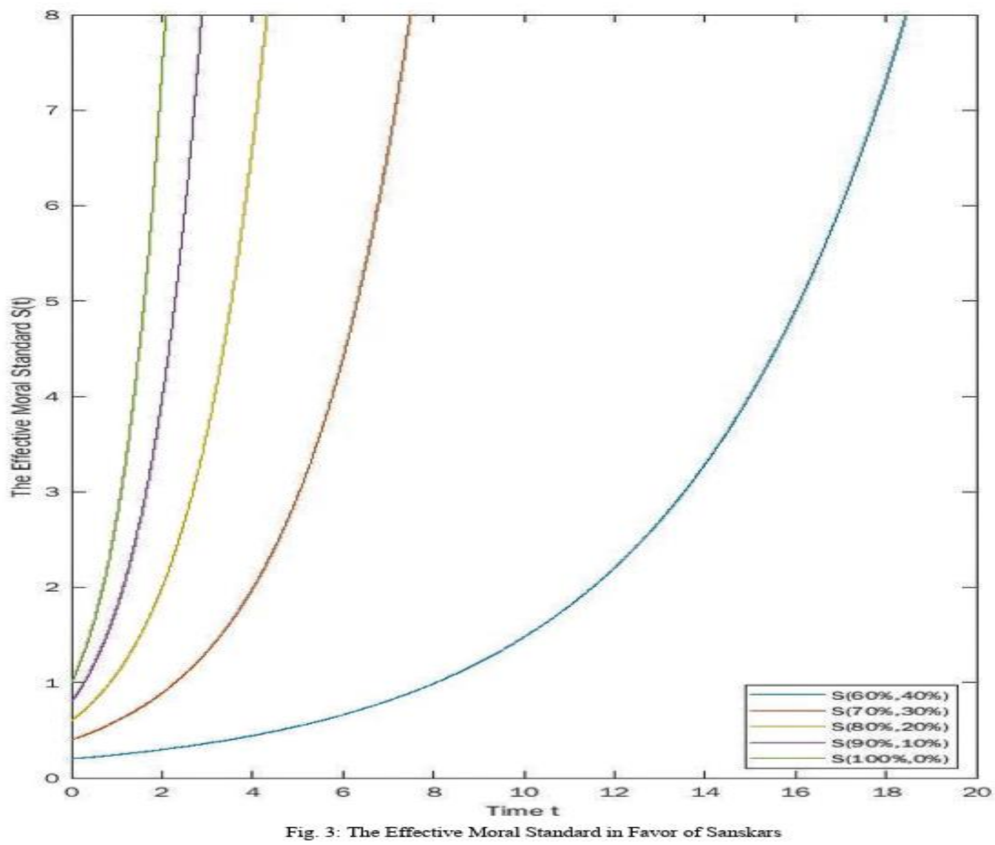

Fig. 3: The Effective Moral Standard in Favor of Sanskars

5.2.2 Case II: $D_s < D_k$ (In Favor Of Kusanskars)

In this case, the effective moral standard remains in favor of Kusanskars and decreases according as increase in Kusanskars. To validate theoretical estimates, Fig. 4 provides us a graph for the following particular possibilities:

i. $D_s = 40\%, D_k = 60\%, S = \frac{1}{5}e^{\left(-\frac{1}{5}t\right)}$ **ii.** $D_s = 30\%, D_k = 70\%, S = \frac{2}{5}e^{\left(-\frac{2}{5}t\right)}$

iii. $D_s = 20\%, D_k = 80\%, S = \frac{3}{5}e^{\left(-\frac{3}{5}t\right)}$ **iv.** $D_s = 10\%, D_k = 90\%, S = \frac{4}{5}e^{\left(-\frac{4}{5}t\right)}$

v. $D_s = 0\%, D_k = 100\%, S = e^{-t}$

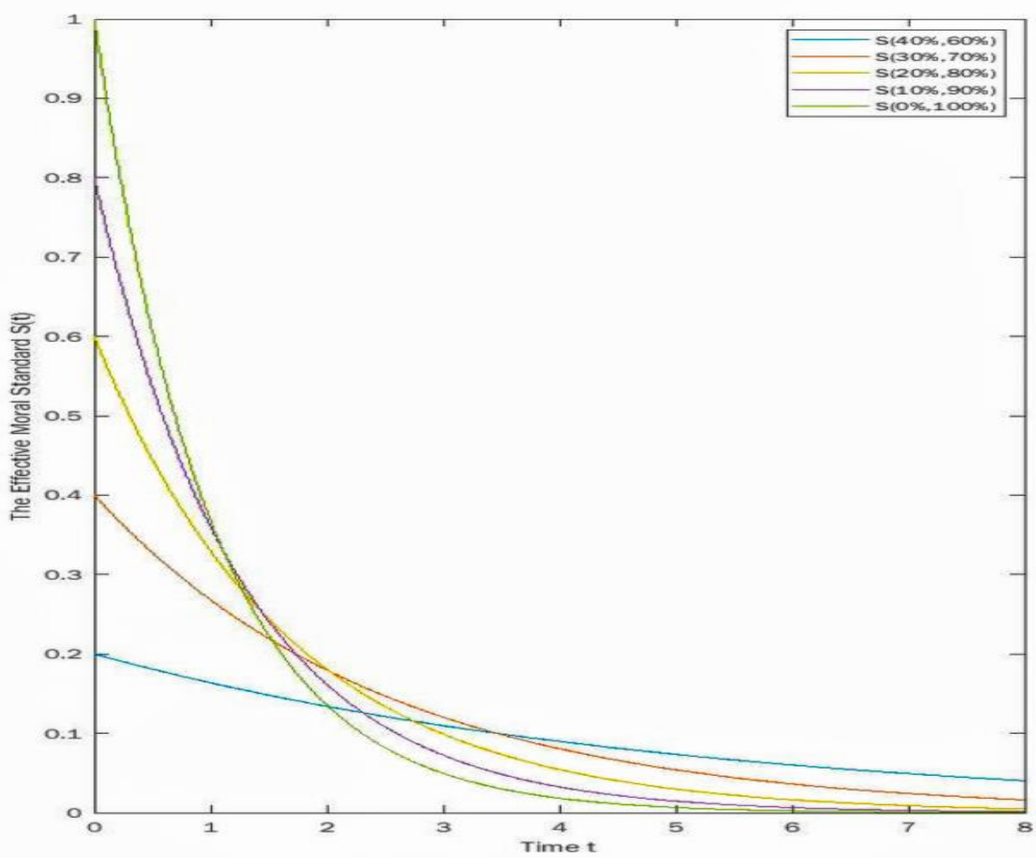

Fig. 4: The Effective Moral Standard in Favor of Kusanskars

Moreover, Fig. 5 gives us a comparative figure for both Sanskars and Kusanskars. Obviously, there is an effective increase in Sanskars in the absence of Kusanskars and in Kusanskars in the absence of Sanskars respectively.

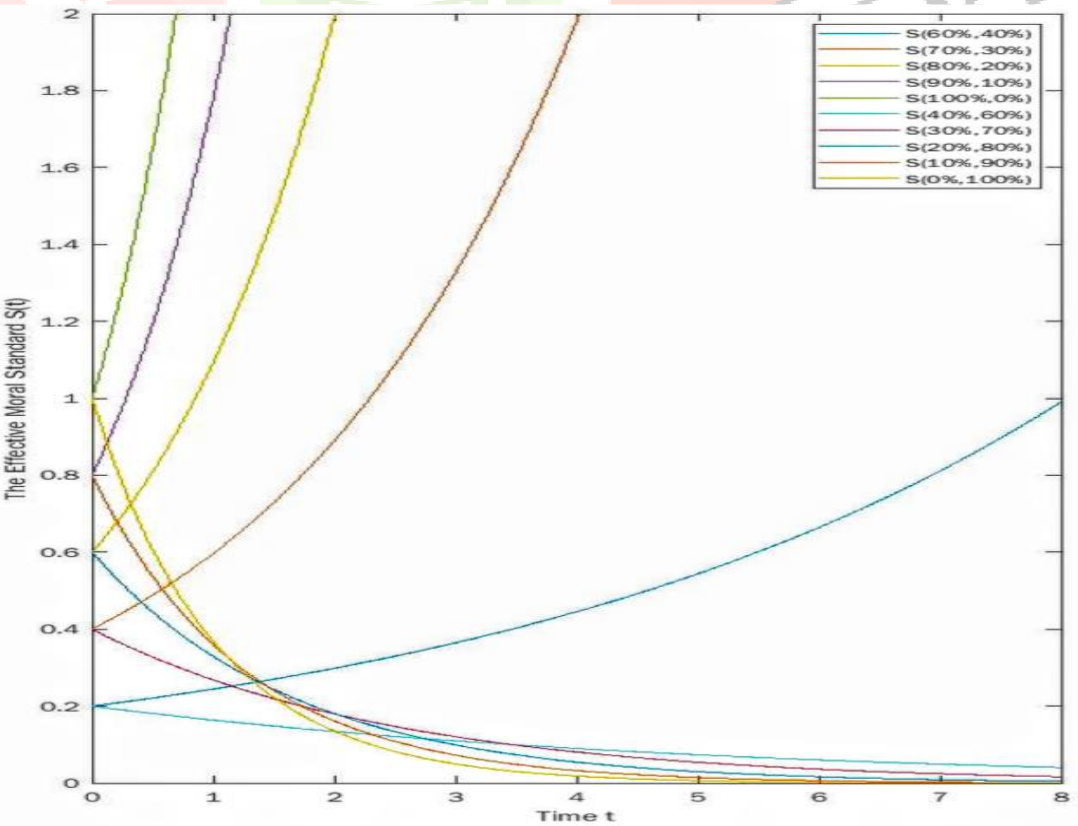

Fig. 5: The Comparative Figure for the Effective Moral Standard in Favor of Sanskars and Kusanskars

5.3 Conclusions

In exponential models, the exponential growth and decay in the input (product material) at the particular time can be found or it can be obtained as the output which depends on the values of the parameters of the assumptions while the Sanskar model does not require any external input, rather it relies solely on the values of the parameters of the assumptions in which the value of the D-factor, D_{sk} keeps on changing with the values of D_s and D_k. That's why D_{sk} is also called associated or generated input. Since, our model is totally described by D-factor therefore this is also called the D-Impaction model.

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