Economic Benefit Assignment in Environmental Cost Allocation: Toward a Suggestion Model

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This paper aims to suggest a model to reward a 'dirty product' which has the potential to offer sales promotion services to other 'clean products' in a multiple product firm. The paper suggests a model – economic benefit assignment (EBA) for apportionment of direct waste costs where a polluting product offers a sales promotion benefit to other 'clean products' of the same company, which proposes that benefiting products should be assigned a proportion of the direct waste cost of the polluting product (as a service charge) based on the proportion of promotion benefit (sales benefit) received from the polluting product. The idea is that, based on transfer pricing theory, such promotion service would be paid for, if offered by an outside agent. Whilst academic debate is expected to ensue from this suggestion model, further case research is imperative to demonstrate industrial applicability.

Key Words: environmental cost allocation, waste cost allocation, economic benefit assignment, performance evaluation, activity based costing, transfer pricing
JEL *Classification:* M11, M41

Introduction

Contemporary pressure for corporate environmental responsibility has caused reforms in costing systems to properly account for environmental costs. Popular methodology to achieve transformation is rooted on polluter pays principle Stenis and Hogland (2002) in which the polluting department is meant to bear its polluting costs by applying the activity based costing (ABC) system (Kreuze and Gale 1994). Thus, improvement in traditional costing system has contributed to improving divisional performance evaluation and incentive schemes in decentralised organisations such as in multiple product firms (Cooper and Kaplan 1988a). This is a notable contribution as divisional performance and incentive schemes depend on effective cost allocation and transfer pricing (Baiman and Rajan 2002). However, although rationally, a pollut-

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ing product should take responsibility for associated environmental cost; this paper attempts to present a simple case of an intangible valuable service which a polluting product may offer to clean products of the same firm, and which may warrant possible sharing of an established direct waste costs of a 'dirty' product amongst benefiting products.

Consequently, the paper is guided by these questions: can direct waste costs of a 'dirty' product be possibly shared amongst multiple products, which derive sales promotion benefit from a 'dirty' product, and what possible method can be used for such allocation? Therefore, the objective of this paper is to use a simple case to explain how an acclaimed 'dirty' product may offer sales promotion service to 'clean' products in a multiple product firm; and to suggest a possible model to allocate the direct waste cost of a 'dirty' product to benefiting products.

The paper is organised as follows: the second section presents a brief conceptual background. The third section is the methodology, presentation and analysis of data. The fourth section presents the suggestion model. Finally, the fifth section concludes the paper.

Brief Conceptual Background

Revolution in business cost accounting system emerged in the late 1980s when famous American authors – Robin Cooper and Robert S. Kaplan posited that the conventional costing system requires adjustment to cope with contemporary trends in manufacturing technology and market conditions (Cooper and Kaplan 1988b). Corporate environmental stewardship has benefit from such innovation in costing system; it assists in tracing environmental costs to responsible products in a multiple product firm. However, complex interactions amongst multiple products may at times hinder objective performance evaluation in a multiple product firm. Such interactions may occur in firms' market environment. For instance according to Cooper and Kaplan; 'many customers value a single source of supply.' Consequently, a company may not simply drop a product line because it is unprofitable (Cooper and Kaplan 1988b); they posit that a product line, even when unprofitable, may boost the performance of other products in a multiple product firm. Hence, objective evaluation of a product performance in relation to other products is vital in building incentives to enhance the efficiency of activity centres (Vieira and Pereira 2010). However, objective performance evaluation may depend on objective cost allocation. Therefore, some authors have examined the fairness in internal cost allocation; for

instance, Choudhury (1990) examine cost allocation 'from the perspective of intra-firm distributive justice' and highlights that unfair cost allocation may cause redistribution of profit and rewards between organisational subunits. Nevertheless, if the controllability principle in cost allocation is adhered to, the uncontrollable factors in performance assessment is neutralised and thus instils fairness in performance evaluation (Giraud, Langevin and Carla 2008; Cohen, Loebn and Stark 1992).

Therefore, it is argued that cost allocation should be consistent with the goal of the firm. Thus, the Oregon Metro (2010, 3) stresses that:

> The cost allocation must balance equity with the agency mission, policies and objectives. When possible, costs should follow a cause and effect link to why the cost was incurred.

Similarly, according to Australian Water Corporation (2011) waste cost allocation should be based on 'equity (no cross-subsidisation), full cost recovery, and user pays charging.' Hence, Choudhury (1990) maintain that when performance rewards and/or incentives are based on profits, cost allocation should therefore be approached from the point of 'intra-firm distributive justice' to ensure the existence of fairness in cost allocation (Choudhury 1990, 217). Choudhury's assertion is confirmed by Horngren et al. (2010, 415) where they maintain that many companies are using return on investment (ROI) as performance measure because it is less complicated for the understanding of managers. Therefore, given that ROI is calculated based on net operating income, it means that wrong apportionment of operations' cost would produce distorted net operating income, and would lead managers into wrong performance evaluation and decisions. Managers' focus on tracking and allocation of costs should not be limited only to conventional costs within the direct and indirect category. Managers should look beyond these known costs and investigate hidden interactions amongst products outside the firm that result in abnormal services and benefits. If such interactions are not made to reflect in cost allocation problems such as in waste costs, there may be potential asymmetry in cost allocation.

To avoid possible bias in cost allocation especially as regards environmental costs, a close attention needs to be given to the performance of a product that is considered 'dirty' in a multiple product firm. In the simple case presented in subsequent pages, a 'dirty' product appears to be promoting the sales of 'clean' products in a multiple product firm. Therefore, the paper suggests that objective evaluation of product perfor-

mance in this company should recognise the obscured sales promotion service offered by the 'dirty' product. Although activity based costing has been effective in environmental cost allocation; it may not be 'inherently positive' in all cases (Englund and Gerdin 2008); in relation to this Kallunki and Silvola (2008) argue that internal and external characteristics of firms may influence the phase of using the ABC system. This implies that ABC may not be suitable in all stages of a product or firm's life cycle and/or specific conditions given the impact of internal and external factors including customer purchase habit and management's marketing priority. This is because in some conditions such as in waste cost allocation problems, whilst ABC allocates direct waste costs to a responsible product, such direct waste cost may be obscurely driven by management decision beyond the control of departmental manager. This is exemplified in this case where the management of WBC Company desires to boost sales of 'clean' products in a multiple product firm by increasing the production of a 'dirty' product in order to stock enough quantity of 'dirty' product in the stores, which the management of WBC believes motives customers to purchase the 'clean' products. This is based on the firm's experience that the 'dirty' product's quality endears it to customers and that such patronage is transferred to other products of the firm when stocked together in the stores. However, the cost allocation implication, notably, direct waste costs seem to be eluding the attention of WBC managers.

This paper proposes that such hidden service by a 'dirty' product deserve recognition, which conventionally should be priced in consonance with the transfer pricing objectives (Bailey and Boe 1976; Bailey and Collins 2005; Baldenius 2006). However, given complex marketing interaction existing between the multiple products in this case; further research is imperative to find possible internal transfer scheme for such obscure and valuable service from a polluting product. Whilst awaiting a suitable internal pricing scheme, a cost allocation model may help to apportion fairly the extra load of direct waste cost triggered by the clean products' reliance on the 'dirty' product's sales promotion service. This paper suggests a model, which suggests that management accounting deserve dynamic innovation (Emsley 2005; Sweeting and Kellet 1991) given growing influence of social and environmental factors in production planning, operations and marketing. The implication is that cost and management accounting systems would continue on a progressive modernization track in conformity with novel challenges arising from

social, environmental and climate change. The case summary, which is a foundation for the suggestion model, is briefly presented in the following pages.

Methodology

This suggestion model of environmental cost allocation is based on a six months market study of consumer purchase habit on products manufactured by WBC Company, a multiple product firm in Nigeria. It is also supported by an administration of short questionnaire to buyers of WBC products. In the paragraphs that follow, the market study data is presented and analysed; this is followed by a simple regression test, and subsequently an analysis of the questionnaire is presented to substantiate results.

WBC Company (a pseudo name) in place of the real company name, manufactures four products weavon, soap, cream, and perfect finish. Weavon is an artificial ladies' hair, acclaimed to be 'dirty' because of much waste involved in the manufacturing process. The company is considered suitable for this study because it is a typical example of a multiple product firm whose products exhibit two characteristics referred to in this paper as 'dirty' and 'clean'. It aroused research interest because the 'dirty' product (weavon), although operating at a loss is still retained by the firm. According to the marketing manager:

> We keep weavon in operation because it helps to retain our market share in the other three products – soap, cream and perfect finish, and occasionally we increase production volume of weavon to maintain stock in the stores to boost the sales of other products.

With the support of WBC Company, a simple market observation in five different retail shops was carried out from January to June 2010 to confirm the marketing manager's claim, and to suggest possible cost implications. Weavon – the 'dirty' product was placed in the stores for three months and was also removed from the stores for three months in an alternating fashion. However, the clean products – soap, cream, and perfect finish were kept in the stores throughout the six months observation. The aim is to ascertain whether the presence of the dirty product in the stores actually promotes the sales of the clean products and whether the sales volume of clean products may decrease if the dirty product is out of stock. Furthermore, direct waste cost implication on weavon due to increase in volume of production is obtained from the cost accounting

TABLE 1 January, 'clean' and 'dirty' products are placed together, sales volume of clean products is observed and recorded

Item	Shop 1	Shop 2	Shop 3	Shop 4	Shop 5	Total
Soap	400	300	200	350	220	1470
Cream	500	400	300	420	350	1970
Perfect finish	450	420	350	400	300	1920

TABLE 2 February, 'clean' products are placed together excluding the dirty product, volume of sales for the 'clean' products are observed and recorded

Item	Shop 1	Shop 2	Shop 3	Shop 4	Shop 5	Total
Soap	200	120	100	150	120	690
Cream	250	180	140	200	150	920
Perfect finish	220	200	120	180	140	860

TABLE 3 March, 'clean' and 'dirty' products are placed together, sales volume of clean products is observed and recorded

Item	Shop 1	Shop 2	Shop 3	Shop 4	Shop 5	Total
Soap	410	280	210	340	200	1440
Cream	520	410	305	400	360	1995
Perfect finish	460	440	370	410	320	2000

department of the WBC Company, and a methodology for allocation to benefiting products is suggested. The focus is on direct waste cost since according to the production manager:

> Heavy cleaning and washing of raw cotton and wool during the production of weavon enhances its admirable quality which we believe endears weavon to the patronage of our consumers.

Tables 1–6 show the sales performance of 'clean' products of the WBC Company when the 'dirty' product was placed and removed in stores with the 'clean' products in alternating fashion between January and June 2010.

PRESENTATION AND ANALYSIS OF MARKET STUDY

Tables 1–6 present the result of a six-month market study, which reveals that 'clean' products experience increase in sales volume if stocked together with the 'dirty' product, and that clean products experience decreased sales volume when the 'dirty' product is out of stock.

Tables 1, 3, and 5 present the sales volume of clean products whilst weavon was in store, with associated volumes of 5360, 5435, and 5570 re-

TABLE 4 April, products are placed together excluding the dirty product, volume of sales for the 'clean' products are observed and recorded

Item	Shop 1	Shop 2	Shop 3	Shop 4	Shop 5	Total
Soap	180	130	105	140	115	670
Cream	260	200	150	205	170	985
Perfect finish	230	210	130	185	150	905

TABLE 5 May, 'clean' and 'dirty' products are placed together, sales volume of clean products is observed and recorded

Soap	420	300	230	360	240	1550
Cream	510	405	315	420	380	2030
Perfect finish	440	450	360	400	340	1990

TABLE 6 June, products are placed together excluding the dirty product, volume of sales for the 'clean' products are observed and recorded

Soap	190	150	110	130	125	705
Cream	280	220	170	215	190	1075
Perfect finish	210	205	125	180	160	880

TABLE 7 Summary of sales volume of clean products

Sales volume with weavon in stores	Sales volume without weavon in stores
5360	2470
5435	2560
5570	2660

spectively. On the other hand, tables 2, 4 and 6 contain sales volume of the clean products whilst weavon was removed from the stores. Associated sales volumes recorded were 2470, 2560, and 2660 respectively. These sales volumes are summarised in table 7.

Physical observation of the above scenario indicates clear difference in the sales volume under the two conditions. A *t*-test of difference in means is employed to check statistically, if one can assert that a difference exists amongst the two observations of sales volume under the two conditions. The *t*-test is presented in table 8.

The *t*-test of difference in means show a difference in means between the two observations as the *t*-statistics is greater that the hypothesised mean (0). Therefore, one may conclude that the presence of weavon in stores influences the sale of other products of the WBC Company.

Additionally, a simple regression test is conducted to ascertain whether

TABLE 8 *t*-test: Paired two sample for means (sales of other products with weavon in stores and without weavon in stores)

Item	With weavon	Without weavon
Mean	5455	2563.333333
Variance	11325	9033.333333
Observations	3	3
Pearson correlation	0.991154274	
Hypothesized Mean Difference	0	
df	2	
t-statistics	285.232243	
$P(T \leq t)$ one-tail	$6.14561e^{-6}$	
t critical one-tail	2.91998558	
$P(T \leq t)$ two-tail	$1.22912e^{-5}$	
t critical two-tail	4.30265273	

TABLE 9 Sales volume of weavon and clean products during the months of placing weavon in stores

Months	Sales volume of weavon	Sales volume of clean products
January	5000	3560
March	5200	5435
May	5300	5570

the sales volume of weavon has a relationship with the movement in sales volume of the 'clean' products. The production and sales volumes of weavon is obtained from the marketing division of WBC for the months of January, March and May – the periods during which weavon was placed in stores alongside with the 'clean' products. The sales volumes of weavon constitute the independent variables (x). On the other hand, the sales volume of the clean products for the months of January, March, and May are used as the dependent variables (y). These volumes are presented in table 9 and are followed by a simple regression test in table 10. The regression statistics also indicate a significant relationship between sales volume of weavon and the sales volume of clean products.

PRESENTATION AND ANALYSIS OF QUESTIONNAIRE

To ascertain whether other factors (apart from weavon) contribute to influence buyers' decision to purchase other products of WBC whilst pur-

TABLE 10 Summary of regression output

Regression statistics								
		Multiple *R*						0.986640939
		R^2						0.973460342
		Adjusted R^2						0.473460342
		Standard error						985.8255858
		Observations						3
ANOVA		*df*		*SS*	*MS*	*F*		Sig. *F*
Regression		1		71294021	71294021	73.358921		0.0739932
Residual		2		1943704.2	971852.09			
Total		3		73237725				
Item	Coeff.	Std. error	*t*-stat.	*P*-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

chasing weavon, a short questionnaire was administered to buyers based on two key issues: to elicit buyers' opinion on whether they actually purchase other products (clean products) of WBC whilst purchasing weavon (dirty product) and to ascertain from buyers if other factors (besides weavon) influence their decision to purchase other WBC products as they visit the stores to purchase weavon. In consideration of existing public apathy to research questions, the questionnaire was limited to six questions to motivate willing buyers to respond to the questions fast within few minutes before or after doing their shopping. The two key issues upon which the questions were centred are:

i Whether the presence of weavon in the stores engenders buyers' decision to purchase other products of WBC, (questions 1–2).

ii If taste, fashion, quality, and price influence buyers' decision to purchase the clean products WBC as they visit the stores.

In section (i) of the questionnaire, respondents were asked to check their preferred box to indicate whether they actually purchase other products of WBC while purchasing weavon; and the responses are analysed in tables 11 to 12.

In section (ii) of the questionnaire, respondents were asked to check their preferred box to indicate the extent to which other factors (fashion, taste price, quality) influence their decision to purchase the clean products of WBC. They were instructed that checking (disagree and strongly disagree) would denote that they purchase clean products because of

TABLE 11 Question 1: I usually purchase other products of WBC when I buy weavon

Item	Frequency	Percent	Valid percent	Cum. percent
Strongly agree	700	87.5	87.5	87.5
Agree	80	10.0	10.0	97.5
Undecided	16	2.0	2.0	99.5
Disagree	4	0.5	0.5	100.0

TABLE 12 Question 2: I purchase a combination of WBC products because of the good quality of weavon

Item	Frequency	Percent	Valid percent	Cum. percent
Strongly agree	720	90.0	90.0	90.0
Agree	50	6.3	6.3	96.3
Undecided	25	3.1	3.1	99.4
Disagree	5	0.6	0.6	100.0

TABLE 13 Question 3: I purchase a combination of WBC products because it is a reigning fashion to have such combination

Item	Frequency	Percent	Valid percent	Cum. percent
Strongly agree	4	0.5	0.5	0.5
Agree	6	0.8	0.8	1.3
Undecided	50	6.3	6.3	7.5
Disagree	10	1.3	1.3	8.8
Strongly disagree	730	91.3	91.3	100.0

their desire for weavon. The objective of questions 3–6 was to ascertain from buyers whether (in addition to weavon) other factors such as (taste, fashion, quality and price) contribute to influence their decision to purchase the clean products whilst purchasing weavon. The summary of questions 3–6 show that only 5% of buyers agreed that taste, fashion, quality and price (and other undecided effects) influence their decision to purchase the 'clean products' of the WBC as they purchased weavon. However, 9.5% disagreed that these other factors influence their decision, which is interpreted to mean that the purchase of weavon is a major factor that influences buyers' choice to also buy other products of WBC (respondents were instructed that checking [disagree and strongly disagree boxes] would denote that they purchase clean products because of their desire for weavon).

TABLE 14 Question 4: I purchase a combination of WBC products because it is my taste

Item	Frequency	Percent	Valid percent	Cum. percent
Strongly agree	3	0.4	0.4	0.4
Agree	5	0.6	0.6	1.0
Undecided	40	5.0	5.0	6.0
Disagree	8	1.0	1.0	7.0
Strongly disagree	744	93.0	93.0	100.0

TABLE 15 Question 5: I purchase a combination of WBC products because it is a cheaper option compared to other similar products in the market

Item	Frequency	Percent	Valid percent	Cum. percent
Strongly agree	4	0.5	0.5	0.5
Agree	6	0.75	0.75	1.25
Undecided	10	1.3	1.3	2.55
Disagree	10	1.3	1.3	3.85
Strongly disagree	770	96.3	96.3	100.0

TABLE 16 Question 6: I purchase a combination of WBC products because all the products have good quality

Item	Frequency	Percent	Valid percent	Cum. percent
Strongly agree	1	0.1	0.1	0.1
Agree	5	0.62	0.62	0.72
Undecided	25	3.1	3.1	3.72
Disagree	50	6.3	6.3	10.02
Strongly disagree	719	89.9	89.9	100.0

TABLE 17 The extent to which other factors (fashion, taste price, quality) influence sale of WBC's clean products

Factors	(1)	(2)	(3)	(4)	Total Frequency	Percentage
Other factors	60	48	20	31	159	5%
Weavon as a factor	740	752	780	769	3041	95%

NOTES Column headings are as follows: (1) fashion, (2) taste, (3) price, (4) quality. Other factors: (taste, fashion, quality, and price): strongly agree + agree + undecided; weavon as a factor: disagree + strongly disagree.

The preceding results closely echoes the WBC's marketing manager's claim that their customers purchase other products of WBC whilst pur-

TABLE 18 Total volume of weavon produced from January to June 2010 with associated increase in direct waste costs

Item	January	February	March	April	May	June
Volume produced	5000	5100	5200	5250	5300	5400
Direct waste cost (000)	*N*100	*N*110	*N*130	*N*150	*N*155	*N*162

chasing weavon and that the absence of the 'dirty' product in the stores causes low sales of these other products. Consequently, given the market interactions between weavon ('dirty product') and 'clean products' of the WBC Company explored in the preceding sections; the author submits that such interactions (give and take services) although obscured, have concealed waste cost implications for the production of the dirty product (weavon). The suggested cost implication and corresponding suggestion model to approach a fair allocation of such cost are discussed in the subsequent sections.

Towards a Suggestion Model of Allocation of Increase in Direct Waste Costs of the Weavon ('Dirty Product')

Information from the production department shows an increase in the production of weavon, which according to the marketing manager is meant to keep enough quantity of weavon in the stores to promote the sales of other products. The crux of this paper is that this increase propels an increase in the direct waste cost of weavon, which could not have arisen if normal production quantity of weavon was maintained. Hence, this paper argues that since this increase in production of weavon and associated increase in direct waste cost is driven by the management's desire to promote the sales of other products. Therefore, weavon should not be held responsible for the increase in the direct waste costs since it is beyond the control of weavon department. Consequently, it may be objective to assign the increase in direct waste cost of weavon to the benefiting products according to the ratio of benefit derived (i. e. increase in the sales volume of 'clean' products) which results from stocking the 'dirty' product in stores. The increase in volume of weavon produced due to management decision and associated increase in direct waste cost for January to June is presented in table 18.

Using the month of January as the base year, the increase in direct waste cost associated with increase in the volume (table 18) of weavon is:

$$N10000 + N20000 + N20000 + N5000 + N7000 = N62000.$$

TABLE 19 Calculation of increase in sales volume of clean products resulting from keeping the 'dirty' product in stores

	Sales volume for soap whilst weavon is in stock	4460
–	Sales volume for soap excluding weavon in stock	– 2065
=	Total increase in sales volume	= 2395
	Sales volume for cream whilst weavon is in stock	5995
–	Sales volume for cream excluding weavon in stock	– 2980
=	Total increase in sales volume	= 3015
	Sales volume for soap whilst perfect finish is in stock	5910
–	Sales volume for soap excluding perfect finish in stock	– 2645
=	Total increase in sales volume	= 3265
=	Total	= 8675

The Suggestion Model of Allocation, Economic Benefit Assignment (EBA), is based on the ratio of promotion benefit derived in relation to other clean products:

$$EBA = \frac{ISV_a}{TISV_{cp}} IDWC_d, \tag{1}$$

where ISV_a = increase in the sales volume of a clean product, $TISV_{cp}$ = total increase in sales volume of the three clean products, $IDWC_d$ = increase in direct waste costs of dirty product (weavon).

However, in consideration of other potential factors that may influence buyers' choice (aside of weavon) to purchase the 'clean' products of WBC, the model above is adjusted to accommodate such other factors. For instance, buyers were asked to rate the influence of (taste, fashion, quality, and price) on their decision to purchase other products of WBC whilst purchasing weavon (see table 17).

Hence, taste, fashion, quality and price, and any other potential factor apart from the presence of weavon are termed as F_{a-z}. Therefore, they are used to adjust the model as $(1 - F_{a-z})$:

$$EBA = \frac{ISV_a}{TISV_{cp}} IDWC_d(1 - F_{a-z}), \tag{2}$$

where F_{a-z} = other factors (apart from weavon) influencing the purchase of clean products, measured in percentage.

Table 17 shows that aggregate percentage of other factors (taste, fashion, quality and price) which influence buyers' choice to purchase WBC's

'clean' products is about 5%. Therefore, the model is applied to allocate the increased direct waste cost of weavon as follows:

$$EBA = \frac{ISV_a}{TISV_{cp}} IDWC_d(1 - 0.05),$$

$$soap = \frac{2395}{8675} N62000(1 - 0.05) = N16261,$$

$$cream = \frac{3015}{8675} N62000(1 - 0.05) = N20470,$$

$$perfect\ finish = \frac{3265}{8675} N62000(1 - 0.05) = N22168.$$

From the market study presented in this paper, the 'dirty' product (weavon) is found to boost the sales of the other 'clean' products in the market, thereby offering an obscured sales promotion service to the 'clean' products, but this relationship appears to be neglected by management. This unrecognised service offered by the 'dirty' product gives rise to two conditions: the sales promotion service (though hidden) is unrewarded and the 'dirty' product continues to shoulder the burden of increasing direct waste costs associated with increased production volume of 'dirty' product which is strategically increased by management to sustain the sales of the clean products. Since the increase in production volume of weavon and increase in direct waste cost is beyond the control of weavon department, the above model apportions the amount of increase in direct waste costs (*N*62000) to the clean products according to the ratio of sales volume increase in relation to other benefiting products. Hence, weavon is freed from the burden of additional direct waste cost which it is not actually responsible to. The author suggest that such allocation would allow equity and fairness in waste cost allocation, and may impact on product costs and prices of both products of WBC. Furthermore, it may also impact fairly on performance evaluation. Overall, such fair allocation would incentivise weavon department toward continual effort in its cleaner manufacturing processes and in upholding its product quality.

Summary and Conclusion

This paper has attempted to suggest a model to reward a 'dirty product' which has the potential to offer sales promotion services to other 'clean products' in a multiple product firm. It is based on a simple case of a six

months market study in five retail cosmetic shops. Consumer purchase preference was observed on 'clean' products made by WBC Company as the 'dirty' product was made to be on and out of stock in the stores in an alternating fashion.

It is found that the polluting product of the company – weavon ('dirty product'), attracts consumers to patronize other three products ('clean products') of WBC amidst other substitute brands by other companies in the same shops. It is also found that the quality of weavon – the 'dirty product' of WBC Company endears it to consumers and that this patronage is transferred to other products of WBC such that if weavon is out of stock in the shops, the 'clean products' experience low sales volume in contrast to when the 'dirty product' is in stock.

This paper argues that since the cost of cleaning and washing of weavon enhances the 'dirty' product's admirable quality which in turn favours the 'clean products' of the WBC Company. Equity and objectivity in waste cost allocation should mean that the increase in direct waste costs, although direct to the 'dirty product,' be proportionately assigned to the 'clean products' which derive sales promotion benefit from the 'dirty product' according to the ratio of promotion benefit derived. It is argued that this is imperative given that the desire by the WBC management to place weavon in stores as a booster for other products increases the production of weavon and also increases the direct waste costs of weavon, which is beyond the direct control of weavon department. Hence, this paper suggests a model – Economic Benefit Assignment (EBA) for apportionment of direct waste costs where a polluting product offers sales promotion benefit to other 'clean products' of the same company, and proposes that, given similar conditions to this case, benefiting products should be assigned a proportion of the direct waste cost of the polluting product (as a service charge) based on the proportion of promotion benefit (sales benefit) received from the polluting product. The idea is that (in consideration of transfer pricing theory) such promotion service would be paid for, if offered by an outside agent. Whilst academic debate is expected to ensue from this suggestion model, further case research is imperative to demonstrate industrial applicability. Further study is also recommended to investigate potential implication for performance evaluation. Such studies are imperative in contemporary period where proper environmental cost allocation has become relevant in divisional performance evaluation and toward incentivising managers' innovative practices in cleaner production.

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