

## Pattern of Cleanliness with Technology Intervention for Innovation Life

Sitti Hutari Mulyani<sup>1</sup>, Billy Hendrik<sup>2</sup>, Rio Andhika Putra<sup>3</sup> and Mardhiah Masril<sup>4</sup>

<sup>1,2</sup> Universiti Kebangsaan Malaysia, Bangi, 43600, Malaysia

Phone: +62811661013

E-mail: sittihutarimulyani@upiypk.ac.id

E-mail: billy\_hendrik@upiypk.ac.id

<sup>3,4</sup> Universitas Putra Indonesia YPTK, Padang, 25221, Indonesia

Tel/Fax: +62751 776666

E-mail: rio.upi29@gmail.com

E-mail: mardhiah\_m@upiypk.ac.id

**Abstract:** Environmental solutions around the world today are making people dependent on technological developments. However, the technology cannot be separated from the community either in the form or its influence, therefore the pattern of behavior of society must also get arrangements for technology to occur as an acceleration of life done properly. This study aims to obtain patterns of community behavior on non-organic waste by using technology intervention. Gap exploration is essential for theoretical and experimental analysis of humans who dispose of unorganic and organic waste out of place. But the field of behavior analysis is uniquely tailored to contribute to this body of work. Sustainable development depends on changing technology to achieve its goals. We report on data collected from an on-line survey, which possible solutions for trash problems. In this paper we present an integrated waste management system with IT that we called I-BSC (Indonesia *Bersih* (Clean), Sehat (Healty) and *Cerdas* (Smart)). This I-BSC is not only for deposit bottles and systems but the system aims also to create awareness of waste production and management, which serves as an educational platform in urban environments for further life innovation.

**Keywords:** Technology Intervention, cleanliness behavior, trash management, environmental psychology

### 1. Introduction

Indonesia is one country that has a very wide area in the world, the total area of Indonesia is 5.193.250 km<sup>2</sup> which includes land and sea [12,14]. It put Indonesia as the 7th largest country in the world after 6 other countries, namely Russia, Canada, USA, China, Brazil and Australia. Compared to the wide range of



countries in Asia, Indonesia is ranked 2nd. Meanwhile, when compared with countries in Southeast Asia, Indonesia is the largest country in Southeast Asia.

Meanwhile, based on the report from the United Nations Population Division on the prospect of the world population that estimates the population of the world by medium fertility method for July 1, 2015, Indonesia itself has a population of 255,708,785 people or 3.49% of the world population and occupies the fourth position in the world.

But for the pattern of people's behavior on waste, Indonesia is ranked second in the world of plastic waste to the sea which reached 187.2 million tons after China reached 262.9 million tons. Based on Jambeck data (2015) [13]

The data proves that the hygiene behavior of Indonesian people, especially on garbage is still not good. It can also be seen from the activities of citizens in everyday life, where although the government has tried to provide training as one strategy to provide information to all levels of society about the implementation of Reduce, Reuse, Recycle and Composting (R3C) in waste management or Recycle waste into products that have economic value [8] [9] [15] [16] [17]. Then the government has also appealed to households, shops and business establishments not to mix materials that can be recycled (unorganic) with organic decomposition by placing it in separate trash bins by providing trash cans Two containers. However, these efforts are still experiencing difficulties because there are still few people who are able to apply the R3C pattern in daily life and still lack of public awareness to separate organic and unorganic waste directly when disposing garbage.

The hygiene behavior that people do to waste, including environmentally responsible behaviors. Hines, Hungerford and Tomera (1986) conducted a meta-analysis of studies pertaining to environmentally responsible behavior, obtaining a number of variables associated with the intended behavior, knowledge of issues, knowledge of action strategies, locus of control, the verbal commitment and sense of responsibility one has. [3]

In this study the authors examine how the pattern of public hygiene behavior if influenced by technological intervention in everyday life. The technological intervention to be provided is a system that supports the government's efforts to create a clean and healthy environment that is "I-BSC System (*Indonesia Bersih Sehat dan Cerdas*)". The I-BSC system is an integrated system with technology and community empowerment and several other variables to manage plastic bottle waste, where every plastic bottle waste disposed of by the community on the I-BSC system will be rewarded with the value of dollars per each bottle so that people can enjoy Cash out system, in addition to the value of rupiah owned can be used to perform electronic transactions and of course will increase public awareness to sort out organic and unorganic waste directly.

## 2. Methodology

In accordance with the purpose of this study is to see how the pattern of public hygiene by applying technology to waste management [10] [11] [18] [19]. In this research, the form of waste management technology used the I-BSC system, then the approach used in this study is quantitative method, this method is called as a positivistic method because it is based on the philosophy of positivism. This method as a scientific or scientific method because it has met the scientific norms are concrete or empirical, objective, measurable, rational, and systematic. This method is also called discovery method, because with this method can be found and developed various new science and technology. This method is called quantitative method because the research data in the form of numbers and analysis using statistics. [4]

The location of the research was conducted at Putra Indonesia University "YPTK" Padang located in West Sumatera province, site selection was based on the consideration that: (1) This location is where the innovation of the I-BSC system originated; (2) there are variation of education level, occupation type and number of respondent's income which enables variation of community hygiene level with existence of I-

BSC system. The subjects of this study were students of Universitas Putra Indonesia "YPTK" Padang and the community residing in Putra Indonesia University "YPTK" Padang, where sampling technique used according to Krejcie and Morgan (1970) [21] with error rate 5% then the population is 500000 people with The number of samples was 384 respondents. Where the characteristics of students and community residing in the University of Putra Indonesia "YPTK" Padang from samples tested based on:

- Gender can be seen in figure 1
- The last education can be seen in figure 2
- Job type can be seen in Figure 3
- Total revenue can be seen in figure 4

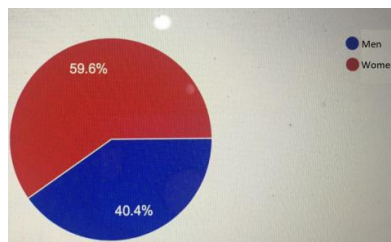


Figure 1. Percentage of respondents by sex

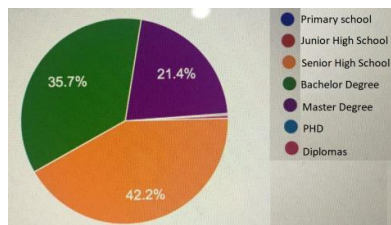


Figure 2. Percentage of respondents by level of education

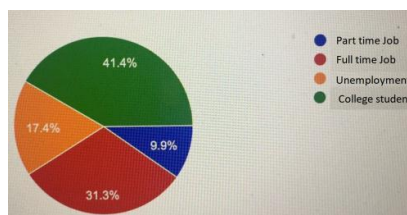


Figure 3. Percentage of respondents by type of work

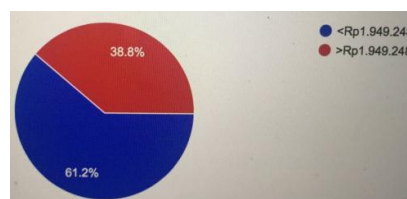


Figure 4. Percentage of respondents by total revenue

The samples were collected by distributing questionnaires online, to find out how the behavior of people in the management of unorganic waste during this time.

In general, community behavior in the management of unorganic waste can be measured from the important components in showing a person's behavior in environmental management (Albert, 2009) [5] [7] [20]. Where the components underlying a person's behavior are related to the understanding of knowledge possessed about waste and waste management, how the habits or behaviors of unorganic waste generated from daily life, the impulse of the social environment and how the society's acceptance of technology.

- Knowledge of waste
- The level of public understanding about the waste based on data obtained is 78.41%.
- Community behavior on waste in daily life

**Table 1.** The results of respondents about community behavior on waste in daily life.

No	Behavior	Yes	No	Sometimes
1	Do you throw rubbish on public roads ?	0.7%	72.7%	26.6%
2	Do you destroy garbage by burning it	27.3%	31.8%	40.9%
3	Do you separate organic and unorganic waste bins ?	29.4%	39.6%	31%
4	Do you bring your own baskets while shopping at markets to reduce plastic waste?	18.8%	45.6%	35.7%
5	Do you throw out plastic bottles immediately?	41.9%	22.9%	35.2%
6	Do you bring your own bottle to reduce plastic waste?	46.4%	20.6%	32.8%
7	Do you reuse or recycle plastic bottle products?	18.2%	41.9%	39.8%
8	Do you collect waste plastic bottle for resale?	21.1%	50.3%	28.6%

#### 1) The impulse of the social environment

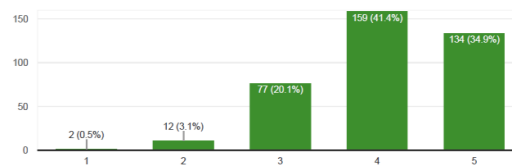
**Table 2.** The result of respondent about influence of the social environment

No	Behavior	Yes	No	Sometimes
1	Have you ever flooded around your neighborhood ?	35.9%	45.8%	18.2%
2	Whether floods happen every year in your residence?	17.4%	60.2%	22.4%
3	Whether in the PKK forum or your community have an independent waste management program or waste bank ?	22.7%	65.6%	11.7%
4	Have you ever been invited by other peoples in your residence to process plastic waste?	28.4%	56.6%	15.1%
5	Have you ever been invited by other peoples in your residence to recycle plastic waste?	30.2%	57.8%	12%
6	Has anyone offered a reward in the form of money or other things if your recycle your trash?	9.4%	83.3%	7.3%

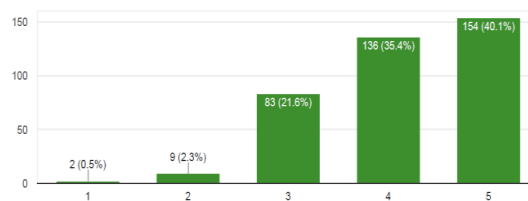
#### 2) The society's acceptance of technology.

After the implementation of the I-BSC system in daily life, the data collecting through the online questionnaire then analyzed to find out how big the influence of technology to the hygiene behavior of the students and the community around Universitas Putra Indonesia "YPTK" Padang. So obtained the results of acceptance of technology with research instruments that have Likert measurement scale with the

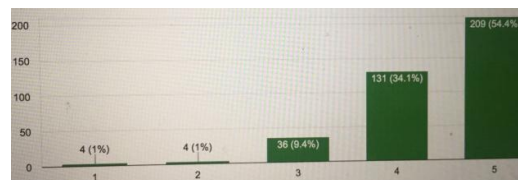
measurement scale used is 1 (very unattractive) 2 (not interesting) 3 (enough) 4 (interesting) 5 (very interesting). Measurement scale is an agreement used as a reference to determine the short length of intervals in the instrument (instrument) so that the measuring tool when used in the measurement will produce quantitative data [6]. The data analysis was done by using statistic by survey, based on the analysis, then the results obtained as shown in Figure 5 to Figure 13.



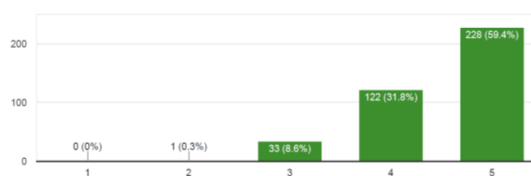
**Figure 5.** The level of respondent's satisfaction with the menu and facilities offered by the I-BSC system



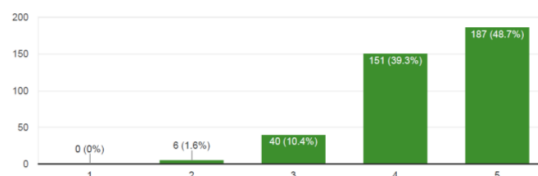
**Figure 6.** Desire to support zero waste movement through I-BSC system

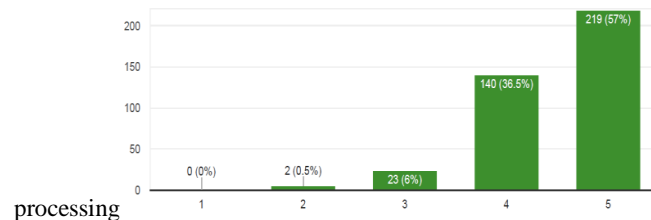
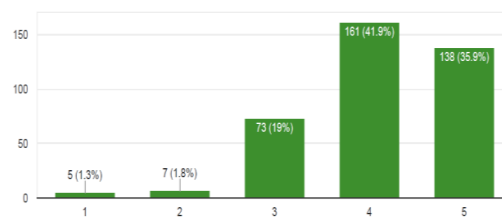
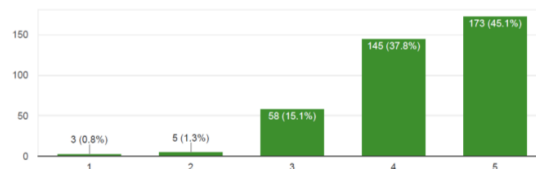


**Figure 7.** The existence of the I-BSC system is useful to improve understanding of waste, especially plastic bottle waste



**Figure 8.** The confidence of respondents to the I-BSC system which is a product of the domestic children who can compete with the outside products.



**Figure 9.** The I-BSC system facilitates the respondents in studying plastic waste waste**Figure 10.** I-BSC Machine will be useful for waste management, especially plastic trash bottles**Figure 11.** Respondents accessing I-BSC to find information on plastic bottle receptacle and information about buying and selling media bottles that have been processed**Figure 12.** Respondents access the I-BSC system to learn waste plastic bottle management into creative goods.**Figure 13.** The level of support of respondents to the I-BSC system as an innovative tool for the community in grind unorganic waste.

### 3. Conclusion and Recommendation

Based on the above analysis, it can be concluded as follows:

**Table 3.** Results of respondents to the I-BSC system

I-BSC System	Scale				
	1	2	3	4	5
The level of menu satisfaction and facilities	0.5 %	3.1 %	20.1 %	41,4 %	34,9 %
Support zero waste movement	0.5 %	2.3 %	21.6 %	35.4 %	40.1 %
Increase understanding of bottled waste	1.0 %	1.0 %	9.4 %	34.1 %	54.4 %
Products that can compete	0 %	0.3 %	8.6 %	31.8 %	59.4 %

Makes it easy to learn plastic waste bottle processing	0 %	1.6 %	10.4 %	39.3 %	48.7 %
Useful for waste management	0 %	0.5%	6 %	36.5%	57%
Provide the media buying and selling of waste processing	1.3 %	1,8 %	19 %	41.9 %	35,9 %
Learning waste management to be creative	0.8 %	1.3 %	15.1 %	37.8 %	45.1 %
Innovative means	0.5 %	1.0 %	8.9 %	29.7 %	59.9 %

Based on Table 3, it can be concluded that respondents said accepting the presence of I-BSC systems, it can be seen from 48.37% of the respondents stated I-BSC system is a very interesting technology, where the system is able to give positive impact to the hygiene behavior of the community where the community is getting used to separating organic and unorganic waste directly, then people are also interested to utilize Facilities - facilities in the system I-BSC both cash out system, electronic transactions and media sales of plastic waste processing products as well as educational information presented by the I-BSC system.

#### 4. References

- [1] B. M. Dwiyanto. 2011. *Model Peningkatan Partisipasi Masyarakat Dan Penguatan Sinergi Dalam Pengelolaan Sampah Perkotaan*. J. Ekon. Pembang., vol. 12, no. 2, pp. 239–256.
- [2] G. J. Amador and D. L. Hu. 2015 . *Cleanliness is next to godliness : mechanisms for staying clean*. pp. 3164–3174.
- [3] I. Wibowo. 2009. *Pola prilaku kebersihan : studi psikologi lingkungan tentang penanggulangan sampah perkotaan*. Makara Sosial Humaniora, vol. 13, no.1, pp.37-47, 2009.
- [4] N. Hayati. *Pemilihan metode yang tepat dalam penelitian (metode kuantitatif dan metode kualitatif)*. Tarbiyah al-awlad, vol. IV, no. 1, pp. 345-357.
- [5] E. S. Albert, S.Y.Hadi and R. G. Sri. 2011. *Perilaku Masyarakat Dalam Pengelolaan Sampah Anorganik di Kecamatan Abepura Kota Jayapura*. Majalah Geografi Indonesia, vol. 25, no. 1, pp. 1-14.
- [6] Sugiyono. 2008. *Metode penelitian kuantitatif, kualitatif dan R&D*. Bandung: Alfabeta
- [7] Wardhana. A.W. 2004. *Dampak Pencemaran Lingkungan*. Yogyakarta: Pustaka Belajar.
- [8] Mulyono. H. 2010. *Model Pengelolaan Tempat Pemrosesan Akhir (TPA) Sampah Secara Berkelanjutan di TPA Cipayung Kota Depok*. Jawa Barat. Institute Pertanian Bogor.
- [9] S. Isti, H. Akhmad dan S. Ade. 2009. *Model Dinamis Pengelolaan Sampah Untuk Mengurangi Beban Penumpukan*, Teknik Industri, Vol. 11, No.2, pp.134-147.
- [10] P.O. Tawiah, P.Y. Andoh, A. A. Agyei, F. Nyarko. 2016. *Characterization of Recycled Plastic for Structural Applications*, International Journal of Science and Technology, Vol.5, No.6.
- [11] J. Siddiqui, G. Pandey. 2013. *A review of Plastic Waste Management Strategies*, International Research Journal of Environment Sciences, Vol.2, No.12.
- [12] R. Lasabuda. 2013. *Pembangunan Wilayah Pesisir dan Lautan Dalam Perspektif Negara Kepulauan Republik Indonesia*, Ilmiah Platax, Vol. I-2, pp.92-101.
- [13] Jenna R. JAmbeck. 2015. *Plastic Waste Input from Land into the Ocean*, Science, Vol. 347.
- [14] M. Zulkarnain, P. Purwanti, E. Indrayani. 2013. *Analisis Pengaruh Nilai Produksi Perikanan Budidaya Terhadap Produk Domestik Bruto Sektor Perikanan Di Indonesia*, ECSOFiM, Vol.1, No.1.
- [15] A. H. Chowdhury, N. Mohammad, R. U. Haque, T. Hossain. 2014. *Developing 3Rs (Reduce, Reuse and Recycle) Strategy for Waste Management in the Urban Areas of Bangladesh: Socioeconomic and Climate Adoption Mitigation Option*, IOSR Journal of Environmental Science, Toxicology and Food Technology, Vol.8, pp.09-18.
- [16] D. Asteria, H. Heruman. 2016. *Bank Sampah Sebagai Alternatif Strategi Pengelolaan Sampah Berbasis Masyarakat Di Tasikmalaya*, J. Manusia dan Lingkungan, Vol.23, No.1.
- [17] Y. Puspita, M. Rahdriawan. 2012. *Kajian Pengelolaan Sampah Berbasis Masyarakat Dengan Konsep 3R (Reduce, Reuse, Recycle) di Kelurahan Larangan Kota Cirebon*, Pembangunan

- Wilayah dan Kota*, Vol.8, No.4.
- [18] Y.P. Deshmukh, A. B. Borade. 2015. *Plastic Waste Management – Present Practice and Future Possibilities*, *International Journal on Recent and Innovition Trends in Computing and Communication*, Vol.3, 2015
- [19] T.Z. Quazi, M.D. Jagtap. 2015. *Sustainable Plastic Waste Management – A Case Study of Thane Municipal Corporation*, *International Journal of Innovations in Engineering Research and Technology*, Vol.2.
- [20] Nazaruddin, 2014. *Analisis Prilaku Dalam Upaya Menciptakan Kebersihan Lingkungan Di Kota Pekanbaru (Studi Kasus Kelurahan Simpang Baru)*, *Jom FISIP*, Vol.1, No.2.
- [21] A. M. Zahran, I. M. Shah, A. Jusoh. 2016. *Consideration and Methodological Approaches in Studying Transformational Leadership Impact on Work Performance Behaviors*, *International Journal of Advances Research*, Vol.4, 2016