

## BRACING MUSIC EDUCATION THROUGH MUSIC TECHNOLOGY (SOFTWARE) IN TERTIARY INSTITUTIONS IN DELTA STATE, NIGERIA.

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### Abstract

This study focuses on the relevance of music technology to primary music teaching and learning. The tertiary institutions offering music in Delta State were the focus of the study.

This study aimed to investigate music technology on primary music teaching and learning, as it enhances general music education and can assist in achieving the set objectives of music education. It also featured some views and contributions of some scholars and musicologists on some concepts and empirical findings that are relevant to this study. The methodology used was a survey; the target population was made up of lecturers and students. It is observed that the majority of the students and lecturers are not exposed to music technology. The students were overwhelmingly willing to be exposed to music technology. The study concludes that we are now in the new age of knowledge development. Tertiary institutions in Delta State should place music education into a platform where music creates revenue and attracts development to the institutions, and creates economic empowerment to the students.

### Background to the Study

Technology has been described as "the making, modification, and usage of tools... to solve a problem or achieve a goal...." ([www.en.wikipedia.org/wiki/](http://www.en.wikipedia.org/wiki/)). Rudolph (1996) holds the perception that "technology can be thought of as anything that uses science to

achieve the desired result. Technology is a scientific knowledge used in practical ways in all spheres of life.; it is the most modern designed machinery or equipment for use in almost all facets of life" (p.4). Today, in everything we do in music one form of music technology is involved; in writing of music to performance of music. There are software and hardware that lecturers and students can engage with to teach and learn music in the classroom, such as television, cable networks, digital video disc (DVD), video compact disc (VCD), computer system, Laptop computer, MIDI (Musical Instruments Digital Interface) and even in the construction of instruments. Adedeji in Adedeji (2004) affirms:

*There is virtually no aspect of musical processes that is not realizable with the computer technology and internet, including global music teaching, research, marketing, audio, and video recording, editing, mixing, mastering, harmonization, and orchestration. Adedeji (2004) further states that "there is over 4,000 music software of different categories. Popular notation software used in Nigeria currently includes the Cakewalk series, Sibelius, Finale, and Noteworthy Composer. Of them, Sibelius is the most comprehensive, easily operated, and less deficient (p. 3).*

Conversely, it is observed that these devices are not utilized to teach/learning in the classroom. Nwamara (2006) asserts that "in the recent times, it will be extremely difficult if not impossible for every average Nigerian musicologist to claim ignorance of the availability of varieties of possibilities in the art of music-making and creation, using computer technology" (p. 125). Similarly, Onyiuke (2009) opines that "today, there is an environment which is ripe for the spread of electronics into the field of music that the impact of the computers on music education is now being felt in Nigeria" (p. 103). However,

technological music devices are not being used, but few lecturers apply these technological devices to teach/learn music composition in some of the tertiary institutions in Delta State.

At this junction, it is imperative to look at the terms used and empirical studies on the relevance of music technology concerning music teaching/learning; in aspects of music technology that enhances music education.

### **Purpose of the Study**

This study aims to investigate music technology in music education in tertiary institutions in Delta State. The following set objectives are guiding it:

- To find out the level of computer and software literacy of the students and lecturers.
- To determine how committed are schools to taking advantage of the technological revolution in education?
- To find out technological devices available
- To examine the level of interest in learning is engendered by the use of new technology.
- For teachers and students willingness to enhance teaching and learning with music technology.

### **Research Questions**

- i. What level of computer and music software literacy do the teachers and students have?
- ii. How committed are schools to taking advantage of the technological revolution in education?
- iii. What are the technological devices available?
- iv. What level of interest in learning is engendered by the use of new technology?
- v. Would the teachers and students want to enhance teaching and learning with music technology?

## Clarification of Terms

### Bracing

In British English, bracing is "refreshing, stimulating, invigorating" [Accessed September 2, 2021. From <https://www.collinsdictionary.com>]. According to Merriam-Webster, bracing in adjective; is "giving strength, vigour, or freshness" [Accessed September 2, 2021. From <https://www.merriam-webdictionary.com>]. Similarly, in Your Dictionary, perceptions bracing in adjective; invigorating or stimulating. Invigorating or refreshing; strengthening. Further defines bracing as "something that provides support to a structure." [Accessed September 2, 2021. From <https://www.yourdictionary.com>].

Some words are related to bracing; tonic crisp, rousing, quickening, restorative, chilly, simulating, cool, energizing, animating, cool, fortifying, reviving, lively, exhilarative (Dictionary.com). [Accessed September 2, 2021. From <https://www.dictionary.com.>browwser>]

Bracing is giving support to strengthen something for a better effect.

### Music Education

Okechukwu (2017) defines music education as "the art or process of teaching, training, and learning music which can be formal or informal because education originally starts from conception; as such, music education starts in the home informally as traditional folk or indigenous music of one's society" (p. 141). Ojukwu in Okechukwu (2017) opines that music education is a process by which individuals become aware of and sensitive to music. The programme enables the learner to come to grip with the socio-musical values established for his/her worthwhile music values in accordance with the changing time and circumstances (p. 142). Music education is the acquisition of musical knowledge and skills in a formal or informal setting by one who desires it. In a formal setting, it is a systematically planned

programme centered on the three domains of learning (cognitive, affective, and psychomotor) to suit the learner and, upon completion, is awarded a certificate. While in an informal setting, it can be organized outside the four wards of education. It can also be acquired by participation or observation. According to Obiesie and Nwamara (2018), music education:

*Touches every aspect of learning/educational taxonomy. These include the cognitive domain (the acquisition of knowledge), the affective domain (the learner's willingness to receive, internalize, and share what is learned), and the psychomotor domain (the development of skills). Music education has often been defined by various Nigeria music scholars to be the sum total of all skills, knowledge, principles, and strategies which a music practitioner needs to acquire in order to be effective and efficient in his/her job as a professional (p. 207)*

### **Music Technology**

Nwamara (2006) infers that music technology is "the incorporation of computer technology into musicology is the employment of computer and its associated hardware and software to assist the study, creation, performance, and preservation of music" (p. 125) Clifton (2010) asserts that:

*Music technology describes the technological equipment used mainly to compose, perform, record, store, and playback modern music". People can study music technology at the university level, giving them a firm grounding in everything from music craft to Today's commercial music business. New music technology creates new techniques and opportunities to explore musically, this field of music helps to spur new music*

*and new forms of musical creativity in Today's artists  
(www.ehowaskdeb.com)*

Music technology is a term that refers to all forms of technology involved with the musical art; particularly the use of electronic devices and computer software to facilitate playback, recording, composition, storage, and performance (www.mhtml:file://H:/Hilliard accessed December 6, 2011). According Beam

*Music technology is the application of technology, such as computers and software, to the musical arts. Whether it is sequencer and editing software or electronic musical devices, musical technology and its definition expands. It is sometimes referred to as sound technology, but while these two fields are similar, they are also vastly different. Music technology encompasses the composition, recording, and playback of music, while sound technology may only encompass the production of various sounds. [Accessed September 1, 2021. From <https://www.infobloom.com>]*

Music technology comprises the various and diverse kinds of technology such as computers, software, hardware, hard disc, microphone, speakers, sound monitor, and others applied to the musical arts education; in composition, notation, recording, analyzing, production of music, sound production, construction of musical instruments. Music technology is also a field of study in music education specialized in different areas of music technology like music technology (mechanical), music technology (electric) music technology (electronic and digital). Mechanical music technology involves using any device, mechanism, machine, or tool by musician or composer to make or perform music; to compose, notate, playback, record songs or pieces; or analyze or edit music. Electronic music technology deals with musical instruments and recording devices that

use electrical circuits, often combined with mechanical technologies. Music technology entails whole lots of others.

### **Impacts of Music Technology on Music Education**

Some music educators like Garcia (2004), Nwamara (2006), Onuora-Oguno (2009), and Onyiuke (2009) carried out studies on the impact of technology on music education. For instance, the research carried out by Garcia (2004) was "the case for technology in music education."

Garcia points out that:

1. The use of technology in music education has affected the change and attitude of students to music learning.
2. Embracing technology and using it to meet music education objectives has empowered students by giving them more control and access to their own (music) education while exploring interest close to their hearts and by becoming musically literate in the process.
3. The use of music technology has the potential to strengthen the position of music in schools.
4. Technology opened the doors to more students. It allowed them to experience music-making as easily as if they were playing in a sandbox.
5. Technological innovations in music have allowed for the same kind of opportunities for general music education for students. What a teacher uses at school to teach can be purchased and used by students at home and teachers. This notion levels the playing field for students and teachers and expands the possibilities, definition, and role of music programmes - enriching them and students for better

Another supporter for revitalizing music through music technology is Nwamara (2006), who found the place and purpose of computer technology in musicology in the following aspects:

1. The teaching and study of music; proper and careful incorporation of computer technology enhances the teachers' sense of professional development and personal growth as computer technology provides the music teacher with tools to develop skills and knowledge. Such tools include various computer software and hardware that satisfy diverse needs in almost every aspect of musicology. It also benefits the students whom these skills and knowledge are being transferred to.
2. Composition/production and preservation of music; computer technology is very essential to the musicologist (composer) from the time he conceives his ideas till he finalizes/rounds off his creative jobs.
3. Performance of music; in performance, the sequencer, which is a computer-aided device, makes it possible for few individuals to play roles that would have required a large number of performers or even an orchestra under normal circumstances. Apart from aiding performance, the computer also helps to improve and control the texture of sound and accuracy of pitches in performances.

In Onuora-Oguno's (2009) viewpoint, the gains of computer applications to music pedagogy are numerous; the computer machinery is flexible and precise and can yield a wide variety of musical applications. Onuora-Oguno (2009) also points out the under listed:

1. In using a computer as a tool in composition, the composer programmes the computer to produce pitches, rhythms, tone colours, and musical elements and to screen these elements through criteria also chosen by the composer. The output may be transcribed for performance by conventional instruments or fed into another device for conversion into sound. The composer's input, in the form of mathematical functions, is translated by the computer into synthesized musical sounds that are stored in digital form and can be played back at will.



Computer can be programmed to produce music in traditional styles and instrumental colours. Its principal attraction to composers has been its ability to expand the previously available range of musical elements such as tone colours and pitches and the new approaches to musical form it makes possible.

2. Illustrations are now easier through PowerPoint presentations.
3. Data storage and retrieval give an office an enhanced status.
4. The techniques of computer technology permit the indexing of music. Today, much software exist that aid transcription of music. Notable among them are Finale, Sibelius, and the noteworthy composer, writing and printing music have been made easier and aesthetically pleasing.
5. Digital libraries and the use of the internet make research easier.

Onwuekwe (2010), on the other hand, enumerates the uses of the computer in music composition as thus:

- (i) The first use of computers was to compose or assist composers in creating works for instrument or electro-acoustic performance.
- (ii) The most significant use of computers has been to synthesize sound waves. Store as numbers, the sound wave are converted into voltages that drive loudspeakers.
- (iii) Although computers can also be used to control analogue synthesizers and other sound equipment such as mixers, direct digital synthesis has the most interested composers because all sounds can be recorded, synthesized, and modified in this way.
- (iv) Computers can be used for musical score writing. This could be characterized as an Information-translating function. Several programmes are now achieving modest success at

producing a traditional written score from some other form of information about a piece of music. The other form may be a list of symbols entered on a typewriter keyboard, or in some cases, it can even be the audible sound of live music reaching a microphone connected to the computer.

Onyiuke (2009), on the other hand, discovers that with the advancement in technology and resultant computer literacy, many benefits are seen in the process of teaching and learning music in the following ways:

1. Computers are playing an increasingly important role in education for both the teacher and the student. Their uses enable each student to develop at his or her own pace and make the whole learning process more flexible.
2. Computer aids to music education have been a major component of the Western pedagogical process.
3. In the area of teaching, there are pedagogical tools that are used by music educators who want to share ideas and information with large or small groups of students.
4. The electronic whiteboard is a computer implement. This could be utilized by music educators in teaching music theory. It is a presentation device, which interfaces with a computer through a digital projector where they can be seen, and users can control the software both from the computer and from the board.
5. Computer usage in and out of the classroom has gone a long way in enhancing the students' learning experiences.
6. The computer can act as a member or coach and observe the use of the medium of students. Apart from acting as a coach, there are software that, when installed in the computer, can serve as a tutor for learning the piano, electric keyboard, guitar, saxophone, and many other musical instruments.

7. Software like Melodic Dictation Computerized Instruction (MEDICI) is used in notating music on a terminal screen. It can help students to jot down the melody played.
8. Computers are generally useful to students especially music students in that it enhances the student's attitudes towards classroom music, improves their level of musical achievements and comprehension of musical concepts.
9. The computer also boosts the learners' concentration, cooperative learning, and level of creativity.

Music technology has a wide range of opportunities to offer to students and lecturers. It has dramatically changed the order of general music education globally as there are now varieties of courses (specialties) and technological music devices emanating from it. The impacts of music technology on music education are boundless. Therefore needs to be grafted into the curriculum of music education in tertiary institutions offering music in Delta State.

### **Methodology**

The design of this research study is a survey. This study was aimed at investigating music technology in music education. The design involves using questionnaires for lecturers and students and interviews with the heads of the music department in tertiary institutions. Books, journals, and the internet were also used. The study was carried out in three (3) tertiary institutions that are offering music studies in Delta State, namely;

1. Delta State University, Abraka.
2. College of Education, Agbor.
3. College of Education, Warri.

**Table: 1 Total Numbers of Respondents for the Study**

S/N	Name of Tertiary Institution	Head of Department	No of Teachers	Total no. of Students	Total
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1	Delta State University	1	5	30	36
2	College of Education Agbor	1	5	15	21
3	College of Education, Warri	1	4	7	12

### Presentation and Analysis of Data

The study aims to investigate music technology in music education in tertiary institutions in Delta State. Some set objectives guide it. There were eight questions containing response options to be answered by the students. The questions in the questionnaire for the lecturers contained nine fixed-response options while, including four questions for the Head of Music Department. Two to four options were provided to be selected from and we applied percentage and item analysis to analyze the data. The table consists of the responses, the number of respondents, and their corresponding percentages. Below is the pattern used to analyze the percentages;  $X/N \times 100/1$ , 'X' stands for the number of responses, N stands for the number of respondents, while 100 stands for the percentage and 1 for constant.

### Research Question One for Lecturers'

The questions asked and the respondents' responses are stated on a tabular form below.

**What level of computer and software literacy do you have?**

**Table 2: Lecturers' Level of computer and software literacy.**

Variables	Basic Computer & software knowledge	Computer music software expert	A Certificate in Computer knowledge	No Computer Knowledge
Responses	2	1	14	0
Percentage	14%	7%	100 %	0%

The data above shows that two respondents (14%) have basic computer and software knowledge, while one respondent claims computer expert (7%). All respondents have basic computer knowledge.

**Research Question Two**

**How committed are schools to taking advantage of the technological revolution in education?**

**Table 3: Responses to if they teach with computer software**

Variables	All	Some	None
Respondents	0	2	12
Percentage	0%	14.3%	85.7%

The data above shows that 12 of the respondents indicated not using software to teach. Whereas two signified using music software to teach.

**In what areas of music education does the department apply music software? Table 4 Lecturers' Responses on the areas of music the department applies music software**

Responses	Frequencies	Percentages
Yes	2	14.3%
No	12	85.7%
Total	14	100%

The data above shows that most respondents (12) indicated not using music software to teach any music course. In contrast, two respondents signified the use of music software in some areas of music.

**What is the music software used for music education in tertiary institutions?**

**Table 5: lecturers' Responses on music software used for music education**

Variables	Tutorial Software	Sibelius, Finale, NoteWorthy composer	Internet	Digital audio/ video	Drill and Practice Software
Respondents	0	2	0	0	0
Percentage	0%	0%	0%	0%	0%

Table 5 above shows that only two respondents use Sibelius, finale, noteworthy composer. The rest of the technological devices stipulated are not used by all respondents to teach.

**What areas of music require music software application?**

**Table 6: lecturers' Responses on the areas of music they apply music software**

Variables	History of Music	Music Composition	Record Music	All of the Above	None of the Above
Respondents	0	2	0	0	0
Percentage	0%	14.3%	0%	0%	0%

The above suggests that the area music software is applied to music learning is composition alone.

**Research Question Three. What are the technological devices available in school?**

Does the school have computers and any other technological devices?

Yes  No

**Lecturers' Responses on the Departments' Possession of any computer applications**

**Table 7:**

School	Responses		Frequencies	Percentages of population
Delta State University	Yes		5	36
College of Education, Agbor		No	5	36
College of Education, Warri		No	4	28

The data above shows that only one school has computers and other technological (36% of the population). In contrast, the (64%) 2 others do not have computers or other technological devices.

**Research Question Four**

**What level of interest in learning is engendered by the use of new technology?**

**Table 8:Level of interest in learning that is engendered by Technology.**

Variables	A motivation to Students to Learn	An Aid to Individual Development	A Teaching and Learning Tool
Responses	14	14	14
Percentage	100%	100%	100%

From the above data, it is discovered that all (100%) respondents indicated that technological devices motivate students to learn. All the respondents also agreed that the new technology is an aid to individual development. The 14 respondents also concur that the new technology is a teaching and learning tool.

### Research Question Five

Will you want music technology integrated into music teaching and learning? Yes  No  Indifferent

Table 9: Desire for the integration of Technology on Music learning.

Responses	Frequencies	Percentage of Population
Yes	12	85.7%
No	0	0%
Indifferent	2	14.3 %
Total	14	100%

The data above shows that 12 respondents want music technology integrated into music learning. While two others were indifferent and no respondent indicated no.

If allowed to undergo an in-service training programme on music technology, will you accept to go? Yes  No



**Table 10: Acceptance of In-Service Training**

Responses	Frequencies	Percentages of Population
Yes	14	100%
No	--	0%
Total	14	100%

All the respondents in the data above indicated that they would accept an in-service training programme on music technology if given the opportunity.

### **Analysis of Students' Questionnaires**

The analysis used for the teacher's questionnaire was also applied for the student's questionnaire.

### **Research Question One for Students**

**What level of computer and software literacy do you have?**

**Table 11: Students' Level of computer literacy.**

Variables	Basic Computer and software knowledge	A Certificate in Computer knowledge	No Computer and Software knowledge
Responses	10		42
Percentage	19%	0 %	81%

The table above indicates that 10% of the respondents have basic computer and software knowledge. None has a certificate in computer knowledge, while 42 respondents have no computer and software knowledge.

### Research Question Two

How committed are schools to taking advantage of the technological revolution in education?

What is the music software used for music education?

**Table 12 Students' Responses on music software used for music education**

Variables	Tutorial Software	Sibelius, Finale, NoteWorthy composer	Internet	Digital audio/video	Drill and Practice Software
Respondents	0	10	0	0	0
Percentage	0%	19%	0%	0%	0%

The data above shows that only ten respondents apply music software to music education, while 42 respondents are not exposed to any music software knowledge.

**What areas of music require music software application?**

**Table 13: Students' Responses on the areas of music they apply music software**

Variables	History of Music	Music Composition	Record Music	All of the Above	None of the Above
Respondents	0	10	0	0	42
Percentage	0%	19%	0%	0%	81%

Table 15 above shows that 19% of the respondents apply music software to music composition, and the 42 (81%) respondents do not apply any music software to music education.

**Research Question Three. What are the technological devices available in school?**

Does the school have computers and any other technological devices?

Yes

No

**Students' Responses on the Departments' Possession of any computer applications**

**Table 14**

School	Responses		Frequencies	Percentages of population
Delta State University	Yes		30	58%
College of Education, Agbor		No	15	29%
College of Education, Warri		No	7	13%

The data above shows that the students indicated that only one school has computers and other technology (36% of the population). While the Colleges of education (64%) do not have computers or any other technological devices.

**Research Question 4. What level of interest in learning is engendered by the use of new technology?**

**Table 15: Level of interest in learning that is engendered by Technology.**

Variables	A motivation to Students to Learn	An Aid to Individual Development	A Teaching and Learning Tool
Responses	52	52	34
Percentage	100%	100%	65%

From the data above, the respondents indicated that the new technology could be a motivation to learn. 100% of the respondents agreed that it would aid individual development, and 34 (65%) respondents signified it is a teaching and learning tool.

**If allowed to study music technology, would you like it?**

**Table 16: Desire for the integration of Technology on Music learning.**

Responses	Frequencies	Percentage of Population
Yes	46	88 %
No	0	0%
Indifferent	6	12 %
Total	52	100%

From the above table, it is clear that almost all the (88%) students signify interest to be taught and learn with music technology. 12% show indifference, wrote because she does not know anything about music technology.

### **Findings**

Despite the advancement and sophisticated world of technology where everything that exists about music is done by technology, the emphasis on the relevance of music technology in music learning (Garcia, 2004; Onura-Oguno, 2009; Nwamara, 2006; Onyiuke, 2009), the education authorities in charge of curricula has not thought towards moving along with the trend, of using technology to teach and learn essential music like other studies. The discussion will follow the sequence of five research questions of this study.

- i What level of computer and music software literacy do the teachers and students have?
- ii How committed are schools to taking advantage of the technological revolution in education?

- iii What are the technological devices available?
- iv What level of interest in learning is engendered by the use of new technology?
- v Would the teachers and students want to enhance teaching and learning with music technology?

**i What level of computer and music software literacy do the teachers and students have?** The survey data showed that the majority (12) of the teachers in this study are not exposed to and do not use music technology. Some lecturers in this study do not know what music technology is, nor do they know its usefulness. Only two out of the 14 respondents (lecturers) have basic computer and software knowledge, and one lecture claimed to be an expert. The majority of the students (42) indicated not to have knowledge of music software. The lecturers lack music technology knowledge because they are not exposed to it. Except the lecturers undertake some refreshers courses to acquire appropriate knowledge and skill in this regard. It is discovered that all the lecturers in Delta State undergo a yearly compulsory computer training programme conversely neither related nor reflected on their field areas.

**ii How committed are schools to taking advantage of the technological revolution in education? (a)What is the music software used for music education?**

The music software used by the two lecturers is Sibelius, Finale, and NoteWorthy composer. There is more than one thousand music software that can be used to brace music education. According to Adedeji (2004), "today, there is virtually no aspect of musical processes that is not realizable with the computer technology and the internet, including global music teaching, research, marketing, audio, and video recording, editing, mixing, mastering, harmonization and orchestration" (p. 3). Colleges of education in Delta State are entirely

stuck to the traditional way of teaching/learning. There is no attempt made to adapt to the new technological way of teaching/learning.

**(b) What areas of music is music software applied?**

Music software is applied only to music composition by two lecturers. If lecturers and schools are committed to taking advantage of the technological revolution in music education, there would be a great and bright future for incoming music students and music graduates.

**iii What are the technological devices available?**

From table 7 and 14, it is observed that the only school with computers and some technological devices is Delta State University. The two colleges of education have no computers neither do they have any other technological appliances.

**iv What level of interest in learning is engendered by the use of new technology?**

From the data in tables 8 and 15 above, the respondents (students and lecturers) indicated that the new technology could be a motivation to learn. 100% of the respondents also agreed that it would aid individual development and 34 (65%) respondents of students signified it is a teaching and learning tool, but 100% of the lecturers agreed it is a

**v Would the lecturers and Students want to enhance teaching and learning with technology**

Table 10 shows that 14 (100%) lecturers indicated an interest in enhancing their teaching with music technology. All the students indicated they would love to use a computer to learn music. If lecturers could follow the relevance to Today's sophisticated world of technology, the future of music education in Delta State would be captivating.

## **Conclusion and Recommendations**

The impact of technology in music education globally has opened doors for varieties of vast music education courses. It has repositioned music education in schools and made music education attractive for more students. Incredibly, lecturers and students engage with one form of music technology or the other conversely are not employed in the classroom teaching and learning experiences. Boody, in Nmadu (2014), opines, "The use of technology is suggested as a means of connecting students to meaningful ways; as a way of embracing relevant, existing forms of learning related to constructive and a postmodern society" (p. 32). Nwamara (2006), on the other hand, stresses that "for Nigeria and its young democracy to attain their desired national standards in overall development, the use of computer technology in music especially in composition is very essential." (p.26)

Therefore, it is pertinent to brace music education with music technology to meet the global trends, create rooms for more students, and add more relevant value to students, departments, institutions, and society at large in terms of social-economic values. Students should be introduced to technology in music learning from year one for mastery and competence. We are now in the new age of knowledge development. Tertiary institutions in Delta State should place music education into a platform where music creates revenue and attracts development to the institutions, and creates economic empowerment to the students. The department can solicit the support of cooperate sectors such as MTN, AITEL, GLO, SHELL, CHEVRON, and a host of others. It is their social cooperate responsibility to society, giving back to the society, and enhancing their operating environment.

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