

A CLD Based Approach to Discover the Boundaries between Music and Satisfaction in Work Life

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Abstract: It is wisely said by William Congreve that music has a charm to soften hard rocks and bend a knotted oak. But does it have any effect at all on busy and stressed-out working people? According to researches, it certainly does. Music has a wide applicability across all the disciplines and the contribution of eminent personalities from diversified back- grounds further enhanced its scope. The role and impact of music in job related work environment has been indicated by various authors and researchers. Music is often treated as a catalytic element for stress management, happiness and helps in performance improvement of employees in the organization. There is an empirically validated positive impact of recorded music on quality of work life (QWL) for employees during work. This serves as the foundation on which this particular paper is focused. The paper discusses some evidences and experiments on how the amalgamation of music in the working environment is significant for better work related to performance, satisfaction and as a focus building tool. Finally with the help of a causal loop diagram (CLD) made through NGT workshops with the experts, the study attempts to explain the cyclic relationship between music insertion and employee satisfaction along with several in-between variables.

Keywords: music; employee satisfaction; quality of work life (QWL); psychophysiological; causal loop diagram; nominal group technique (NGT)

1. Introduction

Human emotion can be stirred by music and this procedure is psychophysiological including the psychology and physiology. Therefore, employing psychophysiological traits may be a technique to comprehend each person's unique emotional response to music [1]. The presence of music is appreciated as an indispensable slice in the lives of humans whether in leisure, religious places, operas, functions, commercials, movie soundtrack, etc. [2]. However, Music cannot merely be heard for entertainment purpose rather as per many studies, it could also be used as a technique for resolving human issues. Many contributors from psychology field have significantly traced the impact of music insertion upon cognitive abilities such as visuospatial abilities, language, memory, etc. [3]. Jourdain has explained working memory as a fundamental component of music. Human brain makes sense the sequence of previous to present audio. The resultant is the ability to perceive associations among musical elements. It is the functionality of these relations and their hierarchical organization that can form the core understanding and enjoyment of music [4].

Some studies have proven how music can cure physical body ailments [5,6]. The insertion of music in the

human mind affects psychophysiological state of human being termed as functional music. The term 'psychophysiological' is associated with combining both mental and bodily processes (Merriam-Webster dictionary). Benenzon [7] has indicated that functional music is not to be heard consciously. In order to take advantage of the phenomenon, the functional music has to be heard passively so as to facilitate sound perceptions unconsciously like background music used in restaurants, malls, working place, clinics, working places, etc. [8] in order to develop the mood and instigate the desired behaviour. Considering the above inferences as the foundation, it altogether consolidates the idea that music can be used to improve human activities.

Daily lives are made more creative by music. It also possesses a wide range of therapeutic benefits. One of the best ways to lower anxiety, unwind the body and mind, and improve memory is through music [9]. Quality of Working Life (QWL) is considered as another attribute of this construct. QWL is an organizational widespread attempt labelled to improve the employee satisfaction, strengthening working environment and helping employees had better learning experiences [10]. Therefore, the purpose of this paper is to discuss and analyse that apart from fundamental QWL attributes, the amalgamation of music in the working environment can contribute to improve QWL and ultimately psychophysiological state of employees. Therefore, as opponents of the Mozart Effect stated twenty years ago, music may increase productivity just because it improves mood. It would appear that music can increase productivity, but that brings up some intriguing issues like which genre of music best promotes productivity.

2. Utility of Music in Psychophysiological Analysis

Sometimes viewing art elicits a powerful emotional reaction in the viewer. Previous research has shown that a rewarding impact as well as psychophysiological stimulation underlies peak emotional experience when listening to music [11].

Gomez & Danuser [12] concluded that in contrast to extra-musical influences, the underlying structure of the music had a key role in the induction of the feelings. Positive and negative valences were best distinguished by mode, harmonic complexity, and rhythmic articulation. The characteristics that had the strongest correlations with physiological indicators were tempo, accentuation, and rhythmic articulation. Fast, emphasised, staccato music increased skin conductance, minute ventilation, and pulse rate while causing quicker breathing. The conclusion that rhythmic elements are the primary determinants of physiological reactions to music is supported by this research. In many cases, the Music is also a very strong therapy in medical ailment.

A popular example of a 30 years old girl is there. Tejasvini Sharma, who was mentally and physically unfit, but through her passion of music and efforts, she walked out of her problem and then was awarded by Honourable Smt. Pratibha Patil (Former President of India) in 2009 [13].

3. Literature Support

Systems approach has gained attention in social sciences. Plethora of researches across various disciplines showcases the wide application of research using systems analysis. Some recent studies have utilised the ISM method in various domains, such as: to understand the enablers of technology adoption in dairy farming [14] and another used FISM to study the challenges of technology adoption in dairy farming [15]; key enablers in the adoption of solar renewable energy products [16]; in analysing enablers and inhibitors in implementation of Total Productive Maintenance [17]; studying the inter-linkages among factors influencing adoption of virtual experiential techniques in ecommerce industry [18]; to understand enablers of supplier selection [19]. These studies are some of the many examples of ISM's potential for analysing complex scenarios involving multiple factors [20].

Since past years, the need for music as a stress reliever is found so relevant and practicable on the customers in malls, hotels, shops, etc. in order to build and outline consumer experience, purchasing behaviour, enhance brand image and emotional links with consumers [21]. Music is not only helpful at working or shopping place, but it also improves personal and work life balance, emotional balance [22], spiritual consciousness [23], physical and mental health ailment [24].

Now, this need is expanding to the initial stages where the employees are building the product/service for the people. Previous researches show a huge positive impact of music on the productivity, stress management and emotional regulation at the workplace [25] as individual and also as a team. Therefore, it is important to understand the dynamics behaving in the working system and its impacts by the insertion of music.

In context of the business organizations, the competition forces the firm to be more productive, competitive, efficient and effective. Ultimately the load is on each sub-unit of the company i.e. the workforce or employee. Today, almost every employee in corporate is suffering from work stress to meet targets, deadlines, client expectation, etc. Therefore, it is the responsibility of the employer to design an effective QWL mechanism for providing stress-free and favourable working atmosphere with minimized dissatisfaction level in the organization so that both individual and team can grow. QWL majorly includes concepts like job security, equality, rewards, training & development, career advancement opportunities and participation in decision-making [26].

The type of music that has effect on employees varies depending on the individual, but music plays a big role in making the majority of workers better employees. Pop, rock, and country music are the most popular genres among the 85 percent of respondents who enjoy listening to music at work [27]. Studies conducted at the University of Birmingham in England demonstrate that music can boost productivity in certain repetitive tasks, such as checking emails or filling out particular spread sheets [28].

56 software engineers were observed working either in silence or while listening to various forms of music. It was shown that music listening improved mood and work quality. In other words, just like the original Mozart Effect, music not only made these programmers happier but also improved the calibre of their work [29]. Up to 9 out of 10 workers, according to a Mindlab International study, perform better while music listening at work. If organizations wish to improve not just the efficiency of the staff but also their mental and emotional health, music is a very effective management tool [30].

More so than music without lyrics, background music with lyrics has a negative effect on attention performance. As a result of the analysis, it was also shown that people who self-reported feeling relaxed when music was playing performed better in terms of their ability to pay attention at work. Additionally, a higher capacity for music to induce melancholy in listeners suggested a poorer rating on their work-attention performance [31].

Since music is so evocative, it is a superb vehicle for conveying human emotion. People frequently use music to change their own mood, get rid of negative emotions, or motivate themselves. Prichard et al. [32] highlighted the relationship between background music and work time. In musical psychology through background music experiences called the Muzak effect, use a narrow theory support for consequences of organizational behaviour. The requirement for testing music and work theory continues as the insertion of music in working environment has intensified [33].

4. Evidences for Positive Relationship between Music and Work Performance

- Fox & Embrey [34] showed that employees engaged in repetitive tasks worked more efficiently with background music.
- Pavlygina et al. [35] proved that playing rock or classical music in the background allowed employees to recognize numbers more rapidly and accurately.
- Results of the empirical research by Lesiuk [33] on software developers indicated that work quality was least without music. Background music brought positive mood change and enhanced efficiency in performance while working. The study developed implications for implementing background music in regular organizational practice.
- Nextiva is a 400 employee's cloud-based communications service provider. This company plays music throughout the office for boosting motivation. The team indicated positive feedback and music keeps everyone in a good temper [36].
- Music helped the employees of Promotion Code to stay focused. Familiar Music directly affects the task quality in a positive way. The company saw 24 percent decrease in errors during three months' time

after adding background music in the workplace [36].

- A research by Cornell University concluded that employees who listen to the happy music are able to make better group decisions. Happy background music pointedly and positively influences the cooperative behaviour as there is a substantial positive association between the mood and cooperative behaviour [36].
- Wholetones is a website which offers the various playlists specifically designed to relieve stress among people and boost productivity. The rationale behind different playlists is that right playlist will help to focus specifically on particular type of task [36].
- Task vs. Playlist: Nicole Stillings aka DJ Rose is a music director from New York City who creates playlists for companies in order to increase focus and productivity. For writing tasks, she recommends to listen something down tempo say like classical music. Similarly for ordinary jobs like checking emails, she suggests listening to something positive and upbeat [36].
- According to Carter [37]:
 - 90 percent workers perform better while listening to music.
 - 61 percent employees do listen to music while working in order to make them happy, motivated and productive.
 - 77 percent small and medium businessmen agree that background music increases employee morale, 40 percent believe that sales are improved and 65 percent believes that employees' productivity is enhanced.
 - Ambient music improves accuracy of data entry in 92 percent of people.
 - Classical music improves accuracy by 12 percent in 88 percent of employees
 - Pop music can reduce mistake chances by 14 percent and 58 percent people accomplished data entry faster when exposed to pop music.
 - Dance related music improves the speed of proof reading by 20 percent.

5. Material and Methods

5.1. Nominal Group Technique (NGT)

It is an immensely efficient when used with the soft systems as a procedure for generating consensus and as a tool for information or idea generation. A NGT is a small, controlled group discussion that aims to bring participants to an agreement on how to determine research priorities. It neutralizes/diffuses the negative effects of group dynamics by avoiding the domination of group participants during discussion session and elicits contribution from all panel members. According to studies, NGT is vastly superior to other interactive group exercises like brainstorming for ideas or problem-solving, etc. NGT sessions start with the purpose of research and the discussion initiates after the expression of triggering question by the session moderator [38].

When necessary, the group will discuss, elaborate, clarify, or add new ideas, and they will group similar or overlapping points of view; and all these are succeeded by the individual points put up by the engaged domain expert participants. Participants then vote, rank, or rate the stated points in order of importance. In order to determine the group's general priorities, the facilitator then condenses the final mean scores. Consequently, the NGT method's stages are helpful for generating a wide range of perspectives and ideas in an organized manner.

5.2. The Domain Experts

It involves people who are informed about the many aspects of the case and who may be affected by the results in some way. It incorporates participants who are stakeholders with in-depth knowledge of the system under consideration and who work in actual environments that share the same environment. The domain experts are crucial element for interactive management techniques, one of which is the NGT [39]. It is a collection of individuals coming together who have knowledge, experience, or both about the chosen area. A seamless and perfect comprehension of the situation under investigation is achieved with the help of consensus building and cooperative efforts, as well as pooled expertise, knowledge, and experience. Domain specialists for a particular issue are selected and invited to participate in the conversation during the planning stage.

These specialists participate in the discussion phase under the supervision of the moderator to support interactive communication on the issue.

Finally, iteration, implementation, or both occur during the follow-up stage. This research has identified and involved a team of 9 experts composing 2 academicians involved in music teaching, 2 faculties cum researchers involved in the cognitive psychology field, researches 1 representative from top officials of private and public enterprises each and 2 employees working in a privately owned organisation where background music is a routine activity during work and 1 private psychiatric counsellor dealing as a psychoanalyst.

5.3. System Dynamics

The system dynamics is somewhat in middle of hard and soft systems thinking. Forrester [40] came up with industrial dynamics and observed the concept of positive and negative feedback in the social systems specifically related to managerial and economic situations. It was the first time; the system was realised as dynamic under social situations rather than static. The foundation of system dynamics is based on role of feedback system theory under the non- linear and complex business environment. According to Forrester, SD involves a feedback loop with crucial elements taken into account for mathematical modelling at further stage. System dynamics deals with unitary approach in complex environment.

5.4. Casual Loop Diagram

In the SD modelling process, a Causal Loop Diagram (CLD) illustrates the so-called dynamic hypothesis, which is a representation of the system structure that is hypothesised to be responsible for an observed dynamic behaviour. CLD was first described by Maruyama [41] is a tool for visualizing the causal relationships among various system variables. There exists connection among various variables that are poorly or vaguely articulated and just mental models are present. CLD provides a base to depict the mental models into a clear picture of influence and associations of variables within a system and from another system or subsystem. It is effective ways of representing how cause and effect works through the links and feedback. The picture is made up of certain words and arrows. A narrative that describes the causally closed condition the CLD portrays is included with causal loop diagrams. The diagram's closed loops, or causal feedback loops, are crucial components of CLDs. The complete stage wise methodology has been provided in Figure 1.

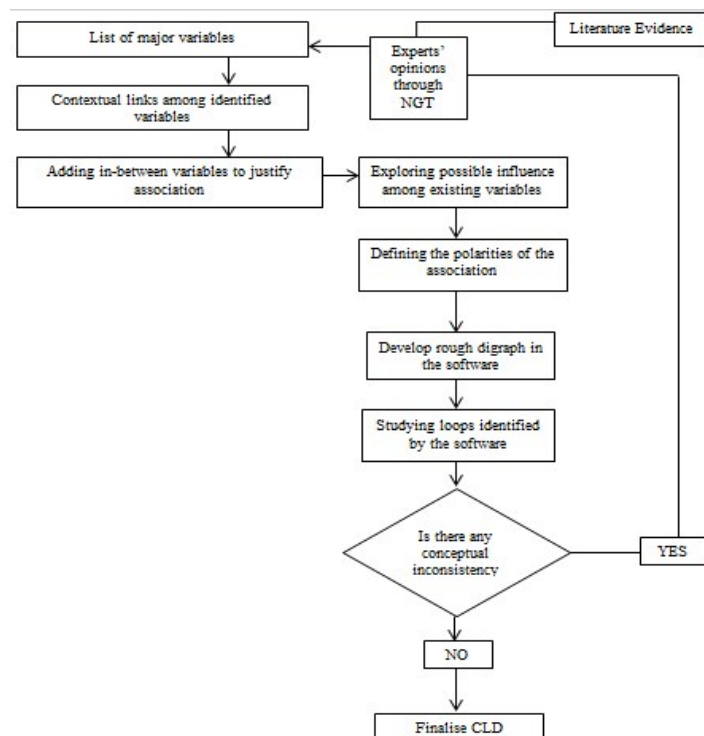


Figure 1. Flow diagram for development of CLD.

6. Findings

The variables from the literature consisting of variables under the situation of role of music leading to satisfaction among employees during work were shown to experts (Table 1). On the basis of the individual points followed by discussion as per NGT procedural requirement, the experts were asked to pick the variables to be taken for analysis, redefine, rephrase (if required) and later on add linking variables to support meaning and conceptual clarity.

Table 1. List of variables from literature.

S.No.	Variable	Source
1	Motivation	[1,37]
2	Better performance	[27,30,37]
3	Productivity	[25,28,36,37]
4	Morale	[37]
5	Improved sales	[37]
6	Happy	[37]
7	Accuracy	[35,37]
8	Work speed	[37]
9	Efficiency	[33,34]
10	Quality of work	[29,33]
11	Positive mood change	[1,29,33]
12	Good temper	[36]
13	Focus building	[36]
14	Better group decisions	[36]
15	Cooperative behaviour	[36]
16	Work life balance	[42]
17	Stress relief	[25,31,36]
18	Emotional balance	[1,22,25,30]
19	Physical and mental health ailment	[5,6,24,30]
20	Work Calibre	[29]
21	Brand image	[21]
22	Cognitive abilities	[3]

On the basis of NGT workshop sessions with the 9 experts, a causal loop diagram has been developed indicated in Figure 2 (Vensim software generated image). The process started with The CLD is a way to understand a complex cause and effect scenario where there is an intervention of several factors or variables and causality exists due to multiple interactions among the variables in the cycle. There are two major points: insertion of appropriate music and satisfaction. Other in-between and bridging variables have been added by the experts wherever required to ensure conceptual consistency and accuracy. The polarity of association is also included. Positive (+) polarity means the variable at the tail of the arrow is directly proportional to the variable at the arrow head. If the former increases the latter also increases and vice versa. Similarly negative (-) polarity indicates the variable at the tail of the arrow is indirectly proportional to the variable at the arrow head. If the former increases the latter decreases and vice versa.

The software has identified 135 feedback loops, but only major loops are highlighted in the paper. The discussion section includes the entire description of the CLD and only loops are displayed and briefly explained

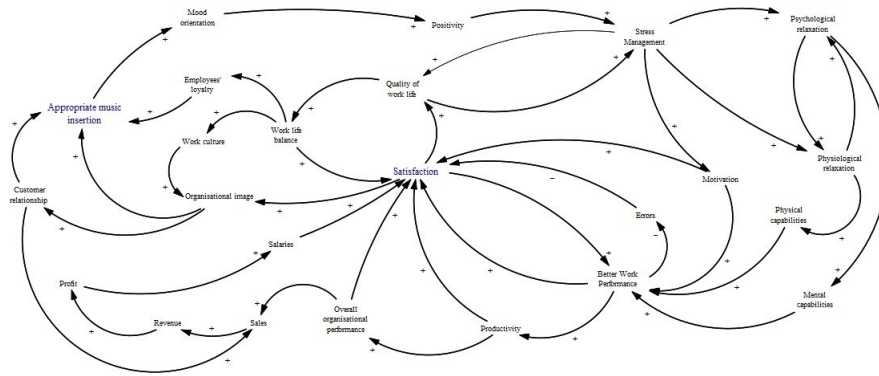


Figure 2. CLD representing insertion of appropriate music to achieve satisfaction in working environment.

in this section. There are multiple pathways to reach to a variable. 2 small loops and 3 big loops have been included for explanation. 2 loops were chosen as out of these two, one loop has a negative polarity (Figure 3) and other has a major reinforcing structure related to satisfaction (Figure 4). 3 loops were chosen on the basis of three ways directly completing the causality loop emerging from appropriate music insertion and ending at that itself (Figures 5–7).

1. Feedback loop indicating better work performance, errors and satisfaction: The better performance ensures fewer chances of errors. This is why the ‘-’ polarity is indicated which means that there is indirect proportionality. If one increases, the other decreases and vice versa. Better work performance and fewer errors both lead to the satisfaction. The satisfaction further enhances the better work performance.

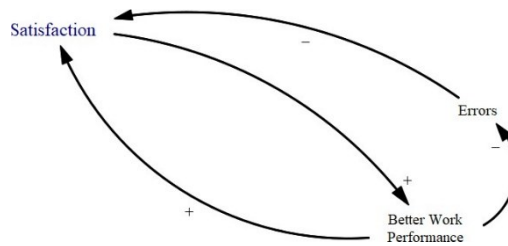


Figure 3. Feedback loop indicating better work performance, errors and satisfaction.

2. Feedback loop indicating satisfaction, quality of work life and work life balance: This is a reinforcing loop since it has ‘+’ polarity in all: the three relations, which can be defined as the satisfaction will have the influence on the QWL. The QWL shall promote work life balance and the balanced work life will again give satisfaction to the employee. This loop keeps on reinforcing itself and is a depiction of causality.

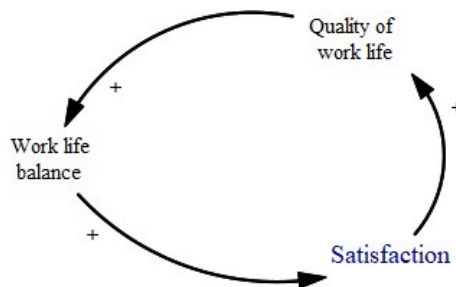


Figure 4. Feedback loop indicating satisfaction, quality of work life and work life balance.

3. Loop starting and ending to appropriate music insertion through employee loyalty: The reinforcing loop indicated in Figure 5 demonstrates the causality from insertion of appropriate music leading to the employee loyalty towards the organization and loyalty further generates need to continue the usage of background music in the working environment. The loop shown has taken the way through psychological relaxation; however the path is also through the physiological relaxation.

4. Loop starting and ending to appropriate music insertion through organizational image: The

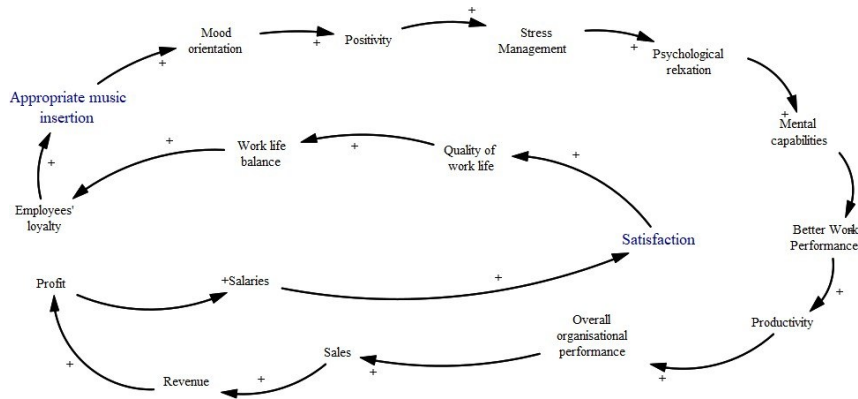


Figure 5. Feedback loop starting and ending to appropriate music insertion through employee loyalty.

reinforcing loop indicated in Figure 6 demonstrates the causality from insertion of appropriate music leading to the organizational image building that further generates need to continue the usage of background music in the working environment.

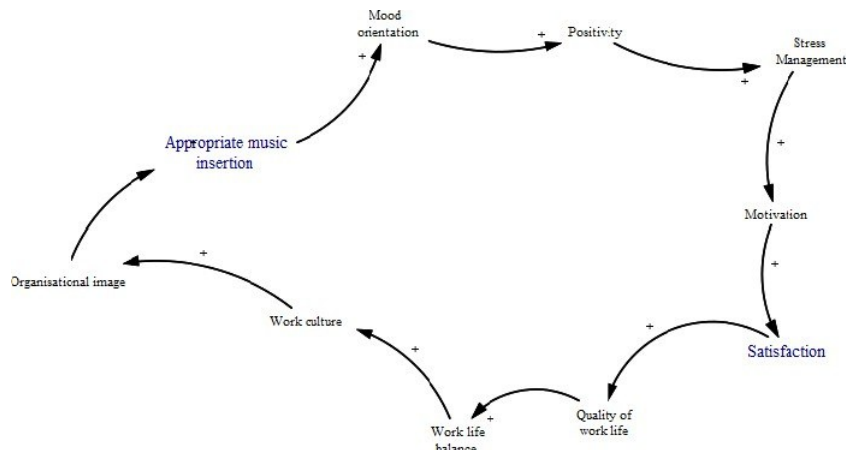


Figure 6. Feedback loop starting and ending to appropriate music insertion through organizational image.

5. Loop starting and ending to appropriate music insertion through customer relationship: The reinforcing loop indicated in Figure 7 demonstrates the causality from insertion of appropriate music leading to the effective customer relationship building that further generates need to continue the usage of background music in the working environment. The loop shown has taken the way through physiological relaxation, however the path is also through the psychological relaxation.

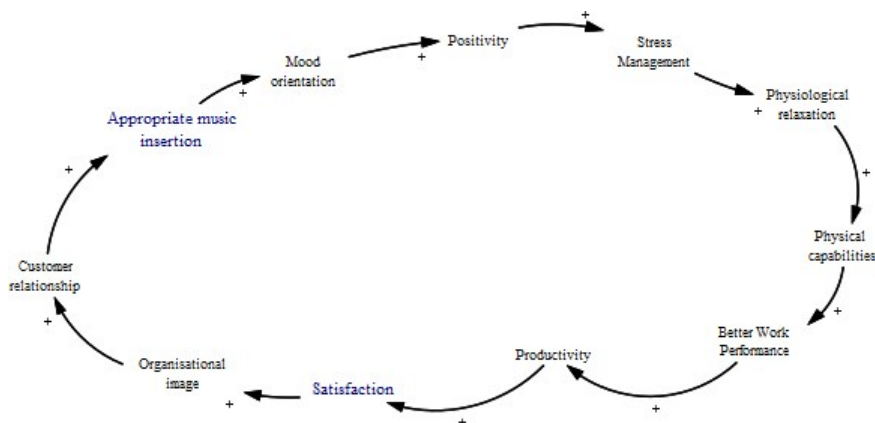


Figure 7. Feedback loop starting and ending to appropriate music insertion through customer relationship.

7. Discussion

- According to the diagram results, two important variables have been indicated as the starting and end point. The first one being the appropriate music insertion and ultimately leading to the satisfaction of the employees or workers. Now between these two, there are several in between variables and links of association. The experts have provided a number of variables that go into how the appropriate music insertion leads to the overall causality in the system. Based on the literature evidences, there has been another aspect mentioned by the experts that insertion of any music may not serve the desired purpose. Therefore, The starting variable has been kept as insertion of 'appropriate' music based on the working task and environment. This has to be kept in mind by the playlist developers to ensure the desired positive impact.
- When music is provided in the background during the work, then due to that there will be a reaction in the form of mood development or mood shifting, which will create a positive feeling among the employees. In such stress either related to work or due to some personal issues can be effectively controlled or managed. It can certainly reduce the tension and mental or psychological well-being is ensured. The mental wellbeing has the potential to have influence upon the physical well-being up to certain degrees. This calls for a causality of relationship since physiological relaxation can influence the psychological relaxation in return. The managed stress motivates to perform better and is linked with satisfaction to employees directly as well.
- Now again the controlled stress has the calibre to promote the quality of work life (QWL) and a good quality work life can again influences the stress management if the stress is related to the workload. Physical relaxation can also be attained directly through the stress management. The psychological relief influences mental capacity and similarly physical relief affects the physical capabilities to perform in a desired manner. Both of these con- tributes towards better work performance and due to this there will be fewer errors in the work which will ultimately give the satisfaction to the employees. Here also the causality as reinforcing feedback can be spotted as the satisfied employees further tend to perform better.
- The individual as well as collective organizational productivity and performance will increase due to better work performance. The individual productivity and the overall organizational performance give satisfaction to employees at various levels including the management and board also. The sales of the product as well as service get improvement as a resultant contributing to increase revenue and profit margins. The output of each employee matters for growth and development of the organization. In such a way, the generated profits might have a positive influence upon the salary provisions for employees as a concept of growth sharing. The raised standard of living due to increased salaries brings satisfaction among the employees and if employees of any organization are satisfied, this creates a tag of a 'good employer' upon the management.
- Sales are the first medium to provide customer base and foundation of the relationship with the customers. A good and established organizational image also helps to attract potential customers or clients to get associated with it and prefer to purchase products or avail services.
- Having work and general satisfaction will lead to quality of work life thereby creating chances for a good balance between work and personal life. Having balanced work will also improve the overall working culture of the organization and due to which the organization will be able to achieve a good organizational image in the minds of customers, people seeking for job in it and the society as a whole. The work life balance brings the loyalty of the existing employees and thus there will be less attrition rate.
- Lastly, the committed loyalty of employees, improved organizational image and a strong customer relationship; all these will have a need to continue the further usage of music insertion in the background while working. However, there may be other variables also that might have the positive influence upon the performance but this CLD has highlighted how music can have the better impact upon the overall satisfaction among the people connected with the organization.

8. Conclusions

Systems' thinking is a means of understanding the complexity of the situation in order to facilitate as a method for seeking clarity of how system performs. The systems' way of thinking promotes exhaustive discussions in a planned way for better and considerable decision making. Both personally and professionally, participants find consensus as useful tool for decision making. In the chosen research situation, CLD as a part of system dynamics has helped to understand how music can have the influence upon the performance of the employees working either in public or private business organizations. Although music has been proven to have an impact upon the performance and satisfaction, but with the help of NGT conducted with the subject experts, this research has aided to understand how and through which variables music leads to satisfaction in which QWL has been taken as the response to the achieved satisfaction. The limitation of this research is that it has not quantified the variables using the next stage of CLD which is known as the stock flow diagram. This is a base for further researchers to carry forward this work after allocating numerical value to statistically measure the impact of variables in terms of degrees and quantifiable model runs.

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Conflicts of Interest

The author declares no actual or potential conflict of interest in any form with relation to this article.

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