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RESEARCH ARTICLE

Innovations and its impact on the productivity in hospitality sector.**Chitra Shashidhar**

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The tourism and hospitality sector is among the top 15 sectors in India to attract the highest foreign direct investment (FDI). During the period April 2000-February 2015, this sector attracted around USD 7,862.08 million of FDI, according to the data released by Department of Industrial Policy and Promotion (DIPP). With the rise in the number of global tourists and realising India's potential, many companies have invested in the tourism and hospitality sector.

For hotels, which are a subset of the bigger conglomerates, national and international, introduction of the innovated products and services suites in their Bangalore units is not a difficult task. After all, the introduction takes place across the entire group of hotels simultaneously, seamlessly and effortlessly, courtesy the many commonalities between hotels in the group. Hence the innovations and their likely impact on the productivity of the Bangalore units of the group should be more or less the same across the country.

Innovation in the hotel industry should be a relentless and continuous exercise since patrons are becoming more and more technology savvy. Given the preferences of the technology savvy patrons, the hotel industry should capitalise on the scope afforded by technology to innovate in the products and services area.

As is the case with any industry, the hotel industry too needs to be on the lookout for productivity enhancement all the time. Such enhancement can be brought about through innovation too.

This study is an effort to find out what innovations are there in hotel sector and what is its impact on the productivity.

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Bangalore's Hotel industry:-

Bangalore is awash, so to speak, with star hotels, which is not surprising. After all, even before the knowledge management industry arrived, the city had been a well known destination for those seeking leisure travel and pleasure travel. The garden city, appropriately dubbed "air-conditioned city" by none other than the first Prime Minister of India, Jawaharlal Nehru, has been home to a motley crowd of hotels and restaurants to cater to the requirements of visitors, national and international. Once the IT industry put down roots in the city, more hotels came up, particularly in the five-star and seven-star space, in that order. The advent of the IT industry had a ripple effect on the city's hitherto tourism-driven economy. More and more people, some of them from abroad, visited the city, on business. In turn, more and more of them checked into hotels. The inauguration of a new international airport in the city, placing the city firmly and prominently on the international air map, accelerated the flow of business visitors into the city. According to yatra.com, there are at least 40 five-star hotels in and around Bangalore city. Some of these five star hotels are part of bigger conglomerates, national and international. Naturally every hotel tries to stay ahead of competition. This calls for cost optimisation and productivity enhancement on the

part of these hotels, amongst other things. One of the tools available for the purpose being innovation, some of them has been investing in innovation. They have been turning out innovative suites of products and services.

Statement of the problem:-

For hotels, which are a subset of the bigger conglomerates, national and international, introduction of the innovated products and services suites in their Bangalore units is not a difficult task. After all, the introduction takes place across the entire group of hotels simultaneously, seamlessly and effortlessly, courtesy the many commonalities between hotels in the group. Hence the innovations and their likely impact on the productivity of the Bangalore units of the group should be more or less the same across the country. However, stand-alone hotels or hotels which are not part of any conglomerate, national or international and hence are few and far between, cannot afford this luxury owing to reasons of financial viability.

This of course has to be followed by area-specific innovations for the hotels to attempt. Last but not least, all innovation-related efforts should be supported by the regulatory regime of the country. The regulator, being one of the important stakeholders associated with the hotel industry, should chip in with its mite. Hence it is necessary too, to ascertain how the regulator can support the innovation-driven productivity enhancement efforts of the hotel industry.

Review of literature:-

1. A survey of corporate-level senior research and development managers in twenty-seven of Spain's largest hotel chains by Mar Vila et al found a general bias toward innovation (Mar, Cathy, & Gerard, 2012). A big chunk of them had formal R&D departments and offered rewards for innovative concepts. Viewing against a framework that included four types of innovation (i.e., product innovations, process innovations, enhanced knowledge of market, and management innovations), the survey found that the chains focused the best innovation efforts on improving management. However, the innovations most frequently mentioned involved enhanced knowledge of the market, including the use of new sales channels and communication improvements. Case studies of four hotel concepts revealed innovations that intended to be unique.
2. The hotel industry has evolved over a long period of time (Hong, 2009). Fierce competition and the recent global economic crisis led the industry to focus on maintaining and raising revenues. By shifting the focus from a 'goods-dominant logic' to a 'service-dominant logic', a new perspective on value creation and service experience has come to the fore, according to the paper presented by the researcher. In this new perspective, value is co-created by various roles, experienced and evaluated by customers. However, the problem is how to implement theories in a specific industry.
3. Innovation has an important role in today's economies, aver Petra Gyurácz-Németh et al (Petra, Nóra, & Alan, 2013). There is no company which can survive in this changing environment without being able to innovate from time to time. In the paper first the innovation theories were introduced and reviewed including the success factors, the advantages, disadvantages and the pitfalls of innovation. Then the case hotel was presented and analysed in the perspective of innovation types, styles and sources as well. It can be stated as the result of the paper that in the hotel signs of incremental innovations can be found instead of radical ones.
4. According to Krishna Shetty and Ramamirtham Gopal, it is now widely accepted that to keep afloat in the competitive scenario, hotels have to constantly resort to technological and other innovations (Innovation and Entrepreneurship, 2012). It helps the hotels to remain ahead of competition and ensure a reasonable return on investment. The researchers conclude that innovation per se does not have any telling impact on the occupancy rate. But innovations in service, ambience, product packages, food and beverages and the technology used by the hotel concerned would have an impact. The researchers conclude that innovation is not a stand-alone factor but can only be a part of other factors for sustainable competitive advantage.
5. Mukesh Kumar Singh and Ritu Arora maintain that the Indian hospitality industry has been witnessing a major shift (Singh & Arora, 2014). Apart from traditional business or leisure travel, India's hospitality sector has been witnessing growth in various segments like meetings, incentives, conferences and exhibitions (MICE), eco tourism, wellness tourism and spiritual and pilgrimage tourism. This emerging

demand from new segments comes from foreign as well as domestic tourists. To cater to this demand, the hospitality industry is designing appropriate product portfolios. The researchers conclude that successful hotels have followed management practices that promote innovation in market orientation and learning orientation.

Research gap:-

The reviewed literature has revealed the possibilities in the innovation space of the hotel industry. Innovation in the hotel industry should be a relentless and continuous exercise since patrons are becoming more and more technology savvy. Given the preferences of the technology savvy patrons, the hotel industry should capitalise on the scope afforded by technology to innovate in the products and services area.

Scope of the present study:-

The study confines itself to five-star hotels that operate in and around Bangalore, the employees and executives employed with them and the customers that patronise them. The study covers 60 hotel employees, 30 hotel executives and 50 hotel patrons.

Objectives of the study:-

The objectives of the study are to:

1. Ascertain if there is scope for innovation-driven productivity enhancement in Bangalore's hotel industry
2. Identify the areas in which such innovation-driven productivity enhancement is possible
3. Suggest the specific innovations that can be introduced in the said areas
4. Ascertain if the regulatory regime should support innovation-driven productivity enhancement endeavours and if so, how.

Hypotheses proposed to be tested:-

The study proposes to test the following hypotheses:

1. There is scope for innovation-driven productivity enhancement in Bangalore's hotel industry
2. To meet its moral obligations, the industry needs to give something back to the society that has helped it succeed
3. To meet its moral obligations, the hotel industry needs to safeguard the environment and ecological system in which it operates

Research methodology:-

The study is descriptive in nature. It has used the 'fact-finding' survey method.

Sources of data:-

Primary data was collected from the respondents, viz., hotel employees, hotel executives and patrons.

Secondary data was collected from the web sites of industry bodies like the Federation of Hotel and Restaurant Associations of India (FH&RA), the Hotel Association of India (HAI) and the financial press.

Sampling plan:-

Hotel employees: Simple random sampling under the probability sampling method was employed to select employees of five-star hotels that operate in and around Bangalore city. Employees with a minimum experience of five years were considered. It gave each element an equal and independent chance of being selected. Accordingly, Interview Schedules were administered to 120 hotel employees. The first 60 Interview Schedules received, duly completed, were selected for the study.

Hotel executives: Simple random sampling under the probability sampling method was employed to select executives of five-star hotels that operate in and around Bangalore city. Executives with a minimum experience of seven years were considered. It gave each element an equal and independent chance of being selected. Accordingly, Interview Schedules were administered to 60 hotel executives. The first 30 Interview Schedules received, duly completed, were selected for the study.

Hotel patrons: Simple random sampling under the probability sampling method was employed to select patrons of five-star hotels that operate in and around Bangalore city. Those who have been patronising any of the five-star hotels for a minimum period of three years were considered. It gave each element an equal and independent chance of being selected. Accordingly, Interview Schedules were administered to 100 hotel patrons. The first 50 Interview Schedules received, duly completed, were selected for the study.

The reasons for focusing on hotels from the 5-star category are fairly straightforward: there is more at stake for hotels belonging to the 5-star category and beyond, in terms of resource optimisation. Hotels belonging to these categories have the financial muscle to undertake innovations since, by default, such innovations are capital – intensive.

Data collection instruments:-

Interview schedules, specially designed for the purpose, were drafted and pre-tested in order to identify the weaknesses, if any, in the instrument. Upon receipt of feedback, they were appropriately revised and finalised for administration to the respondents for collection of primary data.

The Interview Schedules featured open questions and closed questions. Open questions were included since the objective was to identify opinions, ascertain degrees of knowledge and seek suggestions and more information. In some cases, the subject matter of the question was outside the range of the respondent's experience and hence open questions were a superior alternative. Further, open questions were of help in determining the depth of the feelings and expressions of intensity of the respondent. Open questions gave the respondents a chance to think through the topic. Since it was practically impossible for the researcher to assess the level of information possessed by the respondents, open questions came in handy. The response freedom inherent in open questions elicited a variety of frames of references from the respondents, which could provide unanticipated insights. Given the qualitative nature of the values the variables elicited from the respondents, they lent themselves ideally to statistical tools like Likert scale and chi-squared test.

Field work:-

Field work was undertaken by utilising the services of manpower suitably briefed for the purpose. The respondents were contacted individually and personally and their responses were recorded. The researcher faced a few problems from some of the patron respondents during collection of primary data. They were a bit suspect when requested to fill in the Interview Schedule for the purpose of the study. It took a lot of time and effort on the part of the researcher to allay the suspicions of some of them that the researcher was a mole planted by the income tax department!

Data processing and analysis plan:-

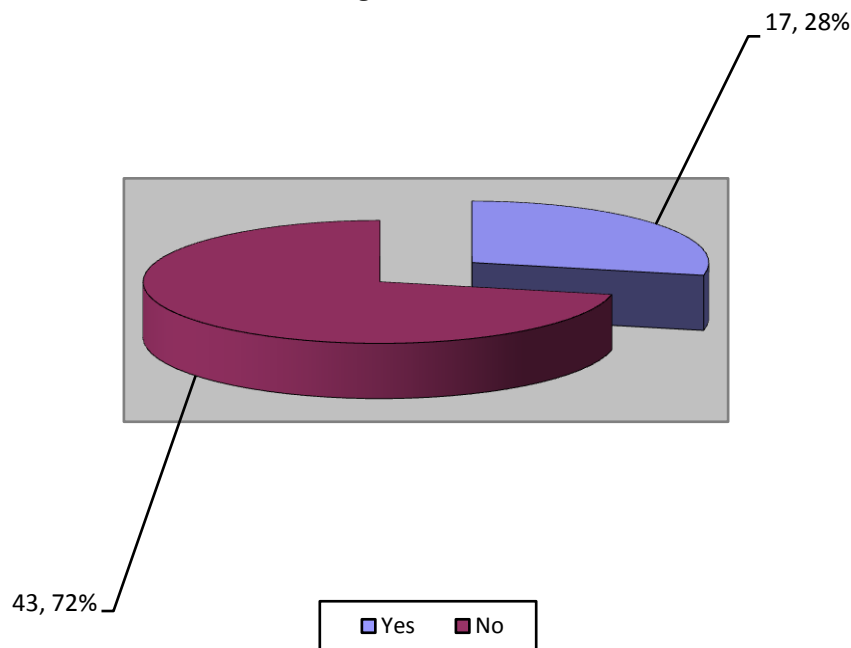
Manual method was used for data processing. For testing the hypotheses, statistical tools like chi-square test and mean were used.

Respondents-Employees:-

Table-1.1-Whether the hotel believes in investing in innovation

Hotel believes in investing in innovation	Number of respondents	Percentage
Yes	17	28
No	43	72
Total	60	100

Figure-1.1
Whether the hotel believes in investing in innovation



According to 17 respondents, accounting for 28 percent, their hotel believes in investing in innovation.

Table-1.2-Areas in which innovation is possible

Areas	Number of respondents
In marketing practices	40
In sales and communication verticals	38
In hotel management practices	32
In energy conservation practices	25
In green practices	17
In eco-friendly practices	13
In design	12

According to 40 respondents, innovation is possible in marketing practices. According to 38 respondents, innovation is possible in sales and communication verticals.

Table-1.3-Areas in which innovation is recommended

Areas	Number of respondents
Green practices	39
Energy conservation practices	31
Design	19

39 respondents recommend innovation in green practices. 31 respondents recommend innovation in energy conservation practices.

Table-1.4-Specific innovations suggested in the energy conservation area

Specific innovations	Number of respondents
Replace incandescent / halogen / CFL bulbs with LED bulbs	31
To conserve water, install low-flow fixtures and flow-restrictors	24
Install biogas plant wherever possible	23
Install lighting controls to turn off and turn on lights in the desired area	22
Install occupancy sensors to turn on or turn off lights in unused areas	19
Install programmable HVAC controls to turn on / off air at meeting rooms, conference rooms, etc, depending upon their scheduled use	11
Install CO sensor / VFD system in parking garages so exhaust fans work only when required	7

31 respondents suggest replacement of incandescent / halogen / CFL bulbs with LED bulbs. 24 respondents suggest installation of low-flow fixtures and flow-restrictors so water can be conserved.

Table-1.5-Specific innovations suggested in the design area

Specific innovations	Number of respondents
Apply solar film to windows to reduce the heat coming in	17
Install rooftop solar water heating system.	16
Exploit hotel room key card energy systems to control the energy used in the room based on occupancy	9
Install CO2 sensors to reduce the need for outside air.	5
Install HVAC cycle managers for improved compressor control	4
Install CMMS systems to control the scheduling of inspections, maintenance and repairs for all assets	3

17 respondents suggest application of solar film to windows to reduce the heat coming in. 16 respondents suggest installation of rooftop solar water heating system.

Table-1.6-Specific innovations suggested in the green practices space

Specific innovations	Number of respondents
Compost kitchen waste and dry leaves	34
Ensure environmental training for all employees	31
Use discarded sheets to make linen bags and cotton napkins	30
Use redundant pipe steel as safety railings or barricades	29
Waste paper accruing from printing can be used as scribbling pad	22
Incinerate all non-bio-degradable waste products	13
Ensure energy audit every alternate year	7

Define a time-bound programme for minimisation of freshwater consumption	3
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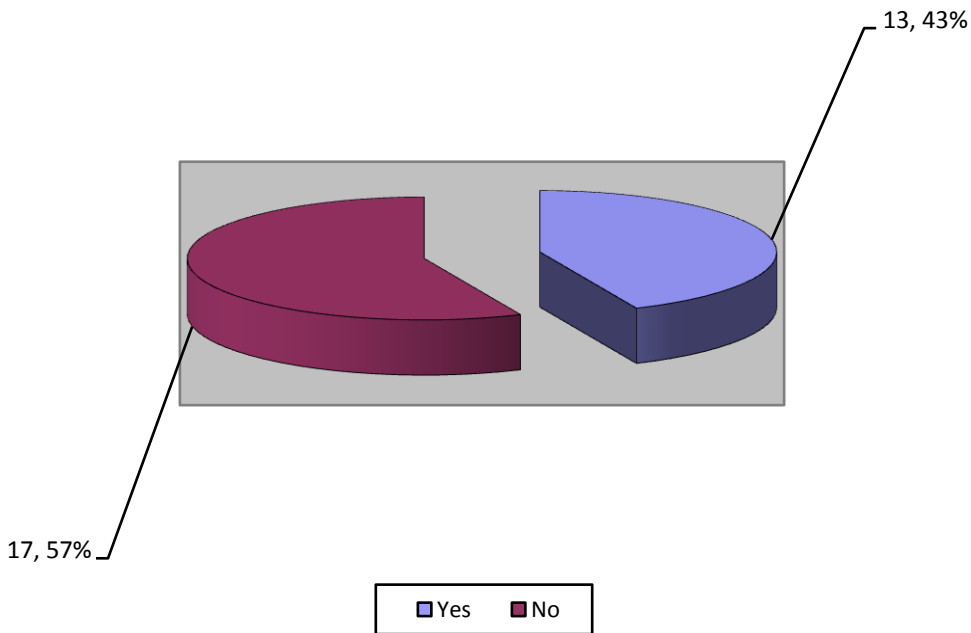
34 respondents suggest composting kitchen waste and dry leaves. 31 respondents suggest that environmental training for all employees be ensured.

Respondents-Hotel Executives:-

Table-2.1-Whether the hotel believes in investing in innovation

Hotel believes in investing in innovation	Number of respondents	Percentage
Yes	13	43
No	17	57
Total	30	100

Figure-2.1
Whether the hotel believes in investing in innovation



According to 13 respondents, accounting for 43 percent, their hotel believes in investing in innovation.

Table-2.2-Areas in which innovation is possible

Areas	Number of respondents
In marketing practices	22
In sales and communication verticals	17
In hotel management practices	21
In energy conservation practices	23
In green practices	24
In eco-friendly practices	25
In design	16

According to 25 respondents, innovation is possible in eco-friendly practices. According to 24 respondents, innovation is possible in green practices.

Table-2.3-Areas in which innovation is recommended

Areas	Number of respondents
Green practices	27
Energy conservation practices	23
Design	17

27 respondents recommend innovation in green practices. 23 respondents recommend innovation in energy conservation practices.

Table-2.4-Specific innovations suggested in the energy conservation area

Specific innovations	Number of respondents
Replace incandescent / halogen / CFL bulbs with LED bulbs	23
Install lighting controls to turn off and turn on lights in the desired area	23
To conserve water, install low-flow fixtures and flow-restrictors	22
Install occupancy sensors to turn on or turn off lights in unused areas	22
Install biogas plant wherever possible	20
Install programmable HVAC controls to turn on / off air at meeting rooms, conference rooms, etc, depending upon their scheduled use	20
Install CO sensor / VFD system in parking garages so exhaust fans work only when required	19

23 respondents suggest replacement of incandescent / halogen / CFL bulbs with LED bulbs. 23 respondents suggest installation of lighting controls to turn off and turn on lights in the desired area.

Table-2.5-Specific innovations suggested in the design area

Specific innovations	Number of respondents
Apply solar film to windows to reduce the heat coming in	17
Install rooftop solar water heating system.	17
Install CMMS systems to control the scheduling of inspections, maintenance and repairs for all assets	17
Install HVAC cycle managers for improved compressor control	16
Exploit hotel room key card energy systems to control the energy used in the room based on occupancy	15
Install CO2 sensors to reduce the need for outside air.	15

17 respondents suggest application of solar film to windows to reduce the heat coming in. 17 respondents suggest installation of rooftop solar water heating system.

Table-2.6-Specific innovations suggested in the green practices space

Specific innovations	Number of respondents
Ensure environmental training for all employees	27
Define a time-bound programme for minimisation of freshwater consumption	27
Incinerate all non-bio-degradable waste products	25
Compost kitchen waste and dry leaves	24
Ensure energy audit every alternate year	24
Use discarded sheets to make linen bags and cotton napkins	20
Use redundant pipe steel as safety railings or barricades	19
Waste paper accruing from printing can be used as scribbling pad	19

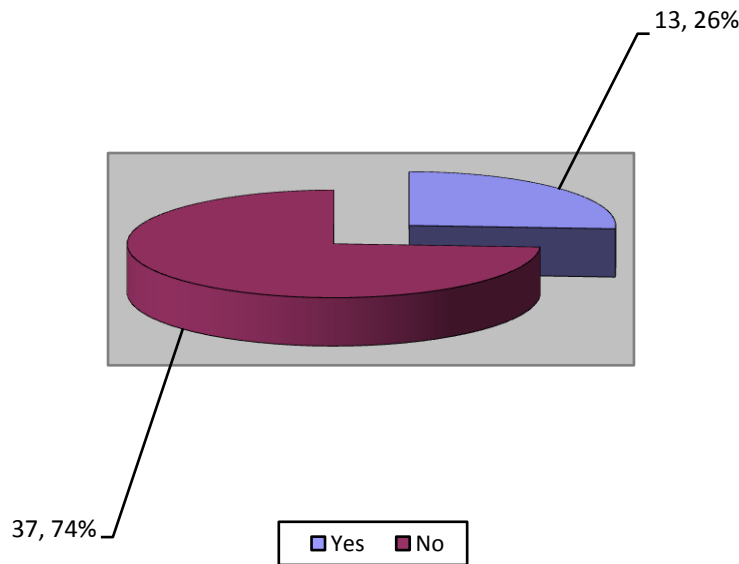
27 respondents suggest that a time-bound programme for minimisation of freshwater consumption be launched. 27 respondents suggest that environmental training for all employees be ensured.

Respondents-Hotel Patrons

Table-3.1-Whether the hotels patronised believe in investing in innovation

Hotels patronised believe in investing in innovation	Number of respondents	Percentage
Yes	13	26
No	37	74
Total	50	100

Figure-3.1
Whether the hotel believes in investing in innovation



According to 13 respondents, accounting for 26 percent, the hotels they patronise believe in investing in innovation.

Table-3.2-Areas in which innovation is possible

Areas	Number of respondents
In eco-friendly practices	50
In green practices	48
In energy conservation practices	41
In sales and communication verticals	27
In design	26
In marketing practices	22
In hotel management practices	19

According to 50 respondents, innovation is possible in eco-friendly practices. According to 48 respondents, innovation is possible in green practices.

Table-3.3-Areas in which innovation is recommended

Areas	Number of respondents
Green practices	45
Energy conservation practices	45
Design	26

45 respondents recommend innovation in green practices. 45 respondents recommend innovation in energy conservation practices.

Table-3.4-Specific innovations suggested in the energy conservation area

Specific innovations	Number of respondents
To conserve water, install low-flow fixtures and flow-restrictors	39
Replace incandescent / halogen / CFL bulbs with LED bulbs	36
Install programmable HVAC controls to turn on / off air at meeting rooms, conference rooms, etc, depending upon their scheduled use	36
Install biogas plant wherever possible	33
Install occupancy sensors to turn on or turn off lights in unused areas	32
Install lighting controls to turn off and turn on lights in the desired area	28

Install CO sensor / VFD system in parking garages so exhaust fans work only when required	22
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39 respondents suggest installation of low-flow fixtures and flow-restrictors so water can be conserved. 36 respondents suggest replacement of incandescent / halogen / CFL bulbs with LED bulbs.

Table-3.5-Specific innovations suggested in the design area

Specific innovations	Number of respondents
Apply solar film to windows to reduce the heat coming in	19
Install rooftop solar water heating system.	21
Exploit hotel room key card energy systems to control the energy used in the room based on occupancy	14
Install CO2 sensors to reduce the need for outside air.	11
Install HVAC cycle managers for improved compressor control	9
Install CMMS systems to control the scheduling of inspections, maintenance and repairs for all assets	8

21 respondents suggest installation of rooftop solar water heating system. 19 respondents suggest application of solar film to windows to reduce the heat coming in.

Table-3.6-Specific innovations suggested in the green practices space

Specific innovations	Number of respondents
Incinerate all non-bio-degradable waste products	41
Compost kitchen waste and dry leaves	37
Define a time-bound programme for minimisation of freshwater consumption	33
Waste paper accruing from printing can be used as scribbling pad	32
Ensure environmental training for all employees	30
Use discarded sheets to make linen bags and cotton napkins	29
Use redundant pipe steel as safety railings or barricades	21
Ensure energy audit every alternate year	19

41 respondents suggest incineration of all non-bio-degradable waste products. 37 respondents suggest composting kitchen waste and dry leaves.

Summary of findings:-

In the following paragraphs, a summarised version of the findings arrived at in respect of the three categories of respondents, namely, hotel employees, hotel executives and hotel patrons is furnished.

Hotel employee respondents:-

1. According to 43 respondents, accounting for 72 percent, their hotel does not believe in investing in innovation.
2. 14 respondents, accounting for 82 percent, state that their hotel does not seek innovation-related suggestions from them.
3. 43 respondents accounting for 71 percent agree with the statement that there is scope for innovation-driven productivity enhancement in Bangalore's hotel industry.
4. According to 40 respondents, innovation is possible in marketing practices. According to 38 respondents, innovation is possible in sales and communication verticals. According to 32 respondents, innovation is possible in hotel management practices. According to 25 respondents, innovation is possible in energy conservation practices. According to 17 respondents, innovation is possible in green practices. According

to 13 respondents, innovation is possible in eco-friendly practices. According to 12 respondents, innovation is possible in design.

5. 39 respondents recommend innovation in green practices.

Hotel executive respondents:-

1. According to 13 respondents, accounting for 43 percent, their hotel believes in investing in innovation.
2. Nine respondents, accounting for 69 percent, state that their hotel seeks innovation-related suggestions from them.
3. 27 respondents accounting for 90 percent agree with the statement that there is scope for innovation-driven productivity enhancement in Bangalore's hotel industry.
4. According to 25 respondents, innovation is possible in eco-friendly practices. According to 24 respondents, innovation is possible in green practices. According to 23 respondents, innovation is possible in energy conservation practices. According to 22 respondents, innovation is possible in marketing practices. According to 21 respondents, innovation is possible in hotel management practices. According to 17 respondents, innovation is possible in sales and communication verticals. According to 16 respondents, innovation is possible in design.
5. 27 respondents recommend innovation in green practices.

Hotel patron respondents:-

1. According to 37 respondents, accounting for 74 percent, the hotels they patronise do not believe in investing in innovation.
2. Nine respondents, accounting for 69 percent, state that their hotels do not seek innovation-related suggestions from them.
3. 45 respondents accounting for 90 percent agree with the statement that there is scope for innovation-driven productivity enhancement in Bangalore's hotel industry.
4. According to 50 respondents, innovation is possible in eco-friendly practices. According to 48 respondents, innovation is possible in green practices. According to 41 respondents, innovation is possible in energy conservation practices. According to 27 respondents, innovation is possible in sales and communication verticals. According to 26 respondents, innovation is possible in design. According to 22 respondents, innovation is possible in marketing practices. According to 19 respondents, innovation is possible in hotel management practices.
5. 45 respondents recommend innovation in green practices and energy conservation practices.

Conclusions:-

Three hypotheses were being tested by chi square method and the x value is been determined. The results were as follows:

1. There is no scope for innovation-driven productivity enhancement in Bangalore's hotel industry.
2. To meet its moral obligations, the industry does not need to give something back to the society that has helped it succeed.
3. To meet its moral obligations, the hotel industry need not safeguard the environment and ecological system in which it operates.

Hence the result disclose the facts that even though there is scope for innovations the hotel industry is not bothered about it for various reasons.

Recommendations:-

1. Hotels must invest in innovation. Innovation leads to superior efficiency especially in terms of optimal exploitation of resources like time, energy and money. Innovation also helps in optimal exploitation of human resources. Resources like time, energy and money are inter-related in the sense that efficient use of time and efficient use of energy (human or otherwise) automatically lead to efficient use of money or working capital for the hotel concerned. Additionally, innovation can help the industry in reducing the costs of externalities such as pollution. It is also the responsibility of the hotel industry as indeed it is of other industries, to help the government in reducing the costs of externalities. Hotels that do not take innovation strongly have to be mandated by the government to change their attitude. However, the government must go about the task rather carefully. The best way is for the government to follow a carrot and stick approach to persuade the hotel industry to take innovation seriously.
2. Innovation-related suggestions need not germinate in educated minds alone. They can generate in the minds of bellhops and chefs too. History is replete with instances of earth-shattering innovations emerging from the shop floor. In the circumstances, hotel managements will do well to entertain innovation-related suggestions from all quarters. The researcher strongly recommends that the hotel managements take this matter seriously and ensure that innovation-related suggestions are welcomed from all sections of their human resources department be they officers or clerks or even sub-staff.
3. Innovation is possible in several areas in the Indian context, given the huge diversity of its population. In fact, pilgrimage tourism, medical tourism, wellness tourism, beach tourism, etc, have been gaining ground in the Indian market. Given that the hotel industry and the tourism industry move in perfect lockstep with each other, it makes eminent business sense and financial sense for the hotel industry to tie up with promoters of such new tour formats for mutual benefit. Together, the two parties can devise and market new packages that focus on what the tourists need or that focus on the places of interest the tourists desire to see, during their sightseeing trips.
4. Water too has been becoming scarce in the country. Potable water and water for other purposes need to be conserved too. Unfortunately, not many hotel patrons realize the importance of conserving water. Either out of inadvertence or out of negligence, they allow precious water to go waste thereby raising the spend on water for the hotels. Hence, by way of abundant precaution, hotels had better install low-flow fixtures and flow-restrictors so water can be conserved.
5. Similarly, the spend on electricity can be curtailed by hotels. Technology has provided tools like sensors which react to physical changes such as the amount of heat or light. Hence, apart from installing lighting control to turn off or turn on lights in the desired area, hotels can install occupancy sensors to turn on or turn off lights in unused areas. Installation of programmable HVAC controls to turn on or turn off air at meeting rooms, conference rooms, etc, depending upon their scheduled use, will go a long way in minimising energy wastage. In fact, technology has advanced to such an extent that hotels can optimise the use of energy even in parking garages. All that the hotels have to do is to install CO sensor / VFD system in the said parking garages. This ensures that the exhaust fans work only when needed.
6. Hotels can also reduce their dependence on fossil fuels and exploit renewable sources of energy for several activities. For example, application of solar film to windows can reduce the heat coming in. Installation of rooftop solar water heating system can help reduce dependence on fossil fuels. Exploitation of hotel room key card energy systems can control the energy used in the room based on occupancy. Installation of CO2 sensors can reduce the need for outside air. Installation of HVAC cycle managers can improve compressor control.