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Emergency Planning and Disaster Recovery Management Model in Hospitality—Plan-Do-Check-Act Cycle Approach

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Abstract: This study aims to present the impact of disasters, such as the COVID-19 pandemic, on the possibility of recovering from and mitigating such impacts. The paper proposes a new emergency planning and disaster recovery management model (EPDRM) which links the ISO 31000:2018 (Risk Management) requirements with the process approach. The model was validated through its application to ISO-certified and ISO-non-certified hotels. The analysis was performed by using an online questionnaire based on the ISO 31000:2018 requirements, where given questions were grouped into 14 categories and presented according to the PDCA (Plan-Do-Check-Act) cycle. The proposed methodology has not been used by other researchers for similar problems. Current results are especially important, because they were collected after the lockdown that had a significant impact on hospitality and tourism in the world. This paper discusses the effect of hotel properties (such as size, certification, and categorization) on the implementation level of the emergency planning and disaster recovery management model. This survey was conducted in 109 hotels in Serbia. The results show that the average level of application was 35.80%. The survey also points to the development possibilities of alternative tourisms in response to COVID-19, and whether the hotel facilities were suitable for such changes in times of increased uncertainty. The results represent the basis of scientific data for improving the national policy, especially during the recovery from a disaster such as COVID-19, as well as emergency planning activities during the pandemic. The study limitations can be identified in the small research sample and insufficient cooperation of contacted hotels as well as the willingness of hotels' managements to participate in the study. The hotels' managers should be aware of the implementation of emergency planning measures, and without their willingness, this cannot be achieved at any level.

Keywords: emergency planning; resource management; hospitality; sustainable business model; disaster recovery management; case study

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1. Introduction

In recent decades, there have been numerous disasters and emergencies that have affected the tourism and hospitality industry worldwide [1]. The COVID-19 pandemic that has had an enormous impact on the economy in the world is ongoing. Considering the lockdown that the majority of countries have been through because of the pandemic [2], the sector that has been suffering the most is the tourism and hospitality industry. Many hotels and tourism agencies have been struck by this disaster [3,4]. The pandemic has had a huge impact on tourism growth, influencing human mobility as well [5,6], and it is considered to be a modern-day disaster.

Research studies that focus on the response plans during the pandemic times [7,8] have included responsibilities on the sector level, including the experience and views of employees. This means that during the pandemic hospitality employees are exposed to both

health and safety risks while working and assuming their everyday responsibilities [9–11]. A study conducted in Vietnam introduced human resource practices that were implemented before, during, and after the lockdown, and that had a great impact on tourism and hospitality businesses in the COVID-19 crisis [12].

Emergency planning is a priority in everyday business, especially in the hospitality industry [13]. Emergency planning in the hospitality industry refers to the process of developing a comprehensive plan to respond to potential emergencies and crises that may occur within a hotel or other hospitality establishment. This includes preparing for a wide range of potential emergencies, such as natural disasters, power outages, fires, terrorist attacks, medical emergencies, and more. Implementing emergency planning and recovery through a management system also represents a great challenge. Effective emergency planning in the hospitality industry involves the following steps: (1) Conducting a risk assessment: Identifying potential hazards and vulnerabilities in the establishment and assessment of the likelihood and potential impact of each; (2) Developing an emergency response plan: This includes creating emergency response procedures, communication plans, and establishing an emergency management team; (3) Training staff: Providing appropriate training to all staff on the emergency response procedures and their specific roles and responsibilities during an emergency; (4) Conducting drills and exercises: Regularly testing the emergency response plan through drills and exercises to ensure it is effective and all staff are prepared to respond in an emergency; (5) Continuously reviewing and updating the plan: Regularly reviewing and updating the emergency response plan based on feedback, lessons learned, changes in the establishment, and changes in the environment. Numerous studies have been done to determine the management model or methodology that should be used in order to be prepared for various emergencies, to have a proper reaction, not to jeopardize the business and to recover from disasters or emergencies [14,15]. It has been emphasized that disaster preparedness and emergency planning for tourism should especially include properly delivered action plans, personnel responsibility and communication [15–21]. Local authorities could contribute to these procedures and action plans, particularly when it comes to hotel facilities [13], and these emergency plans should be in correlation with actual laws and regulations [22,23]. Having a proper plan and well-trained teams represents the essential requirements for disaster mitigation and emergency recovery. Resource management is crucial for such crises and should be planned long-term [24]. Resource reorganization represents an essential part in disaster recovery, bearing in mind that hotels are facing challenging situations in the post-emergency and disaster recovery stage [25–27]. Immediately after a disaster strikes, disaster recovery should include re-establishing normal social, economic, and business routines and activities [1,28]. A recovery management model should also offer benefits in terms of reducing costs, increasing effectiveness, and reducing or eliminating possible future hazard vulnerability immediately after the disaster [29–31]. The importance of the recovery stage is discussed especially in [32–34], where it was stated that a successful emergency management plan should consider the speed needed by hospitality entities to recover and continue normal business operations, and the time required by a business to recover to the stage before the disaster.

In order to offer the organizations a systematic model for identification and emergency and risk management, as well as for properly developed response and recovery procedures that are needed for identification and implementation of improvements seen in an emergency management system, it is necessary to create a model that would be integrated into the management system [35]. The study presented in [36] proposed a four-phase model that is based on the PDCA cycle (Plan-Do-Check-Act): preparation and planning—plan phase; development and implementation—do phase; evaluation and check—check phase; improvements' implementation—act phase. This research was inspired by the study presented in [36], and the PDCA cycle model was used, as it has been proved to be a useful tool that enables problem solving in a more efficient way. The PDCA model is recognized as a model that stimulates continuous improvement of people and processes, enabling

organizations to test possible solutions on a small scale and in a controlled environment, before updating existing procedures and working practices.

The motivation for this study was to investigate the influence of the pandemic on the hotel industry in Serbia. Due to the lockdown, many people could not travel abroad, and they traveled within the country during the summer months. The hotels near lakes, rivers, and historical monuments that were operating at the time were fully booked, while the hotels in large cities were empty. It was interesting to investigate whether the managements of the hotels were ready to overcome the consequences of such a crisis and adjust to the current needs of the market.

The idea was to propose a model for investigating the current state of emergency planning and disaster recovery management in order to highlight the critical elements that should be monitored and improved. The proposed model that was used for the survey was developed specially for hotel facilities and included elements that are connected to overcoming the consequences of the COVID-19 pandemic. This model can be upgraded for different sectors, without any limitations as to territorial affiliations, natural and economic environments, and legal requirements.

The research results provide crucial data important for the national policy improvement on the scientific level, as well as a developed model based on the Plan-Do-Check-Act (PDCA) cycle for emergency planning and disaster recovery management model system application. This study would enable the hotels' managers to develop improvement options in their processes and to include risk management and emergency planning in everyday activities. Scientific data and the verified EPDRM model would enable the policymakers to address risk management regulations in the hospitality sector.

The rest of the article is organized as follows: Section 2 presents the literature review and research gap. Section 3 discusses the research methodology and evaluation steps. The case study, analysis and results are presented in Section 4. The discussion of the results and the theoretical and practical implications can be found in Section 5. Finally, Section 6 presents conclusions, limitations, and future research directions.

2. Literature Review

The Risk Management Standard ISO 31000:2108 defines principles [37] and provides a globally applicable risk management reference guide with a generic three-pillar architecture (principles; framework; process) [38]. Risk management includes [37]: (1) Risk mitigation, to reduce risk possibilities; (2) Risk accepting, not applying any treatment for that risk; (3) Risk avoidance, doing nothing or continuing activities that create these risks; (4) Risk sharing, an action to reduce risk possibilities.

Bearing in mind the importance of creating a culture of risk awareness to integrate risk planning into business models and decision making, the hospitality sector has evidently changed and improved their business models, and managers in hospitality are now deemed to have greater skills than before [39]. The hospitality sector aims to manage risk more strategically in order to achieve its own organizational objectives.

Significant losses caused by various disasters have led to the establishment of emergency management, as a significant research field not only in the hospitality sector but in general [40,41]. It is significant to emphasize the application of the risk management assessments based on ISO 31000:2018 in the hospitality sector. The study [42] used an ISO 31000-Based Risk Management model to improve a travel company performance. The authors in [42] identified five types of risk in tourism: financial risk, operational risk, environmental risk, competitive risk, and economic risk. Risk and risk management practices in different hotel types in Goa were analyzed through an ISO 31000 standard based model [43], and it was shown that international hotels present more risks than local and national hotels.

The impact of COVID-19 on all aspects of the tourism and hospitality sector threatened tourism sustainability before policymakers could even react [44]. The COVID-19 crisis highlights the need to foresee future pandemics from a population-based management perspective and to apply more creative decision-making approaches to avoid negative

consequences [45]. The COVID-19 pandemic had and still has a great impact on the hotel sector. Risk management aims to identify, analyze, and control risks in every organization's activity to obtain higher effectiveness and efficiency. The study [46] analyzed the process of implementing Risk Management in the hotel sector in Padang during the COVID-19 pandemic. The authors in [47] identified the necessity to establish an efficient emergency management system within an organization and to integrate the practice of turning emergency plans into existing business models, while the study [48] defined challenges with post-disaster recovery planning. Emergency management and comprehensive disaster reduction in Chinese rural areas during the COVID-19 pandemic were presented in [49]. The technique for order of preference by similarity to an ideal solution as a multi-attribute decision-making technique was used to develop a hospital emergency and disaster management index in Indonesia [50]. The research paper [51] discusses the role of gamification as a novel technique in motivating community engagement in disaster-related activities and how it can be incorporated into disaster emergency planning.

Since small tourism enterprises have been heavily affected during the COVID-19 pandemic and have had difficulty in business recovery, the research in [52] explores the direct impact of small hospitality enterprises' resilience on sustainable tourism development and the indirect impact through performance. It is especially important to analyze appropriate strategies for hotels in each crisis phase [53,54]. The study [53] refines a pandemic crisis management framework in the context of the COVID-19 pandemic. A case study approach supported by both quantitative and qualitative analysis was presented in the study [54], which examined two hotels in Oklahoma City. This study contributes to the tourism crisis and disaster literature by providing micro-level strategies. A comparative analysis of three Canadian provinces was presented in [55], while a comprehensive study in India's hospitality and tourism industry during the COVID-19 pandemic was conducted in [56].

The presented studies are ISO 31000:2018 requirement-based and there are no data concerning the level of ISO 31000:2018 implementation in dependence of an enterprise properties in service industries. As integration ISO 9001 into the ISO 31000:2018 represents a new perspective, there is no proper evidence in practice, especially in the hospitality sector. Forming a new PDCA cycle approach ISO 31000:2018-based model was quite challenging, while the pandemic was ongoing. There are no similar studies found in the literature on the emergency planning and disaster recovery management model in hospitality in the region of southeastern Europe, even though the subject is an important one. The presented research is intended to fill this literature gap and was inspired by [36] yet using the data after the COVID-19 pandemic and with a different research sample related to business processes. The SEE hospitality sector is faced with major challenges to survive in the market, especially to provide ISO certification, which is due as well lack of investments and governmental support, especially in the time of COVID [57].

3. Methodology

The study was performed by using an online questionnaire and telephone interviews for hotels that are located in Serbia. The research sample was created with the basis supplemented by the National Tourism Organization of Serbia. The conditions for all organizations that were included in the research were the following: Organizations had to be registered in Serbia, had to be liquid, and had to be registered in the National Tourism Organization of Serbia. The presented questionnaire was based on the ISO 31000:2018 requirements for Risk Management and ISO 27031 for disaster recovery [36,58,59]. ISO 27031 is designed to help organizations ensure that their ICT systems are prepared to support critical business processes and activities during and after disruptive events, such as COVID-19.

The research methodology flowchart is presented in Figure 1.

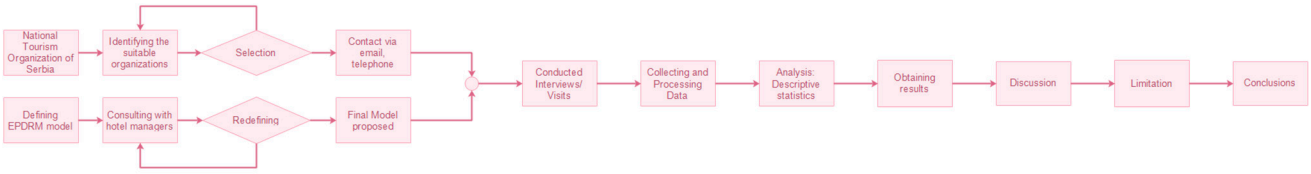

Figure 1. Research methodology flowchart.

The questionnaire consisted of three parts: (1) Basic information about the hotels; (2) Questions about the implications of COVID-19 for tourism; (3) Questions about emergency planning and disaster recovery management implementation presented according to the PDCA cycle (14 categories) (Figure 2). The third part of the questionnaire offered the following responses: "Yes" (2 points), "Partially" (1 point) and "No" (0 points). The points were used to calculate the emergency planning and disaster recovery management implementation level. As anonymous answers, they were further used in the analysis.

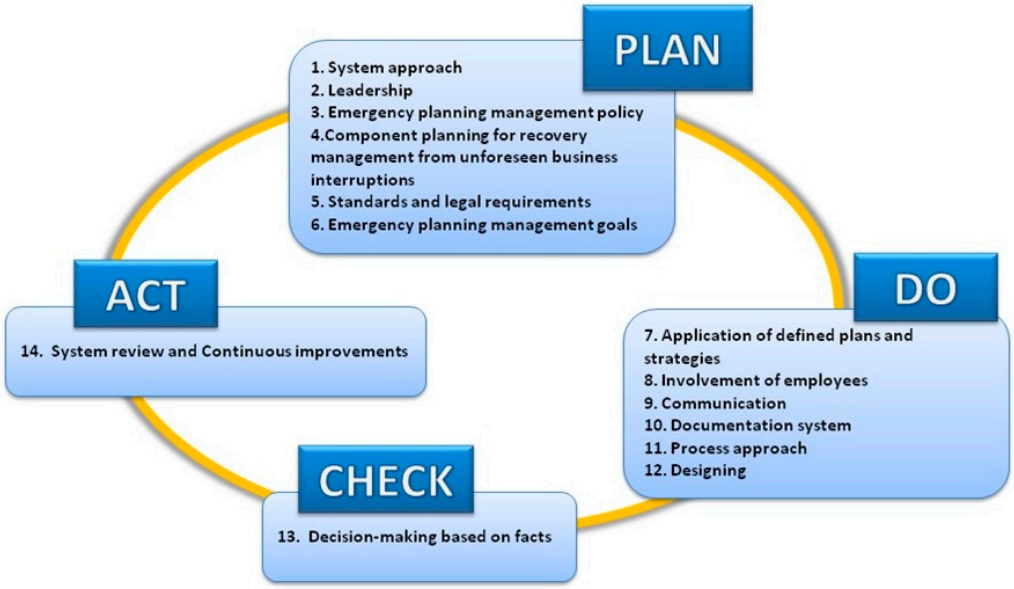

Figure 2. Categories of questions according to the PDCA cycle.

To formulate the general hypotheses of the study, the challenge of the implemented EPDRM was taken into account, especially knowing the financial constraints in the hotel sector in Serbia:

General hypothesis (H1): There exists a significant and effective relationship between the emergency planning and disaster recovery management model in hotels and the level of their development.

Hypothesis 1 (H1): *Hotels that have implemented management systems apply requirements for EPDRM at a higher level.*

Hypothesis 2 (H2): *The level of requirements application for EPDRM depends on the size of the analysed hotel.*

All selected hotels were contacted via email and telephone (287 in total). The number of received questionnaires was 109, i.e., that was the number of hotels and motels that were included in the presented study. The questionnaire response is given in Supplementary File S1. The response rate was 37.98%, and the survey was conducted from August 2020 to June 2021.

For analysis, descriptive statistics were used, and the averages, standard deviations, minimal and maximal values were calculated for all parameters. In the discussion section, the basic information about the respondents was used in order to analyze the relationship between emergency planning and disaster recovery management implementation and the characteristics of the hotels. In this study the XLSTAT statistical package for quantitative data analysis was used. Cronbach's alpha was 0.974. The Mann-Whitney U test and Kruskal-Wallis test were used as well. The Mann-Whitney U test represents a nonparametric test used to compare two independent groups on a continuous or ordinal dependent variable. It is a nonparametric alternative to the independent samples t-test, which requires the assumption of normal distribution of the dependent variable [60]. The Kruskal-Wallis test represents a nonparametric test used to compare three or more independent groups on a continuous or ordinal dependent variable [61].

Demographic Data

According to the Republic Ordinance on standards for categorization of hotel facilities [62], the analyzed sample distribution was: 10.09% of the analyzed hotels have 5-star categorization, 79.82% 4-star categorization and 10.09% 3-star categorization. And according to [63], the territorial distribution of the researched sample was: 33.03% of the analyzed hotels were in the region of the Belgrade Municipality, 30.28% were in the Vojvodina region, 16.51% were in Šumadija and West Serbia and 20.18% were in South and East Serbia (Table 1).

Table 1. Elements of researched sample identity.

Variable	Property	*n*	%	Chart
Categorization	5-star	11	10.09	
	4-star	87	79.82	
	3-star	11	10.09	
Size based on the employees' number	0–10 employees	41	37.61	
	11–50 employees	34	31.19	
	51–250 employees	32	29.36	
	>250 employees	2	10.83	
Years on the market	<3 years	17	15.60	
	3–5 years	13	11.93	
	6–10 years	20	18.35	
	>10 years	59	54.13	

In order to present the profile of the analyzed hotels, it was investigated whether they have any additional facilities and services. In the research sample, 31.19% of hotels have indoor/outdoor pool(s), and 68.81% do not have any; 55.05% have spa and wellness centers, while 44.95% are without a spa; 36.70% of the analyzed research samples have a gym, while 63.30% do not; finally, 44.04% have a congress hall, and 55.96% do not have one.

The presented research included different size hotels. The majority of the presented research sample are, in fact, micro-organizations (up to 10 employees)—37.61%, followed by small organizations (from 11 to 50 employees)—31.19%, and medium-sized organizations (from 51 to 250 employees)—29.36%, and finally, large organizations (more than 251 employees)—only 1.83%. For the research, it was important to have an insight into whether the hotels possessed any certified management system. An amount of 18.35% of the research sample have no certified management systems. A certified quality management system exists in 40.37% of the analyzed hotels, while a certified environmental management system is present in 22.94%, and food safety management is certified in 68.81% of the analyzed entities. The majority of the hotels in the research sample were founded more than 10 years ago—54.13%, followed by 18.35% of the sample present on the market

between 6 and 10 years, 11.93% between 3 and 5 years and 15.60% that had operated for less than 3 years.

4. Implementation of the Emergency Planning and Disaster Recovery Management Model in Hospitality

The second part of the survey was created in order to analyze the results of the emergency planning and disaster recovery management model in the situation of the present pandemic of COVID-19. The aim was to investigate the abilities and possibilities of hotels to overcome business difficulties and to adapt to new conditions of lockdowns and post-lockdowns. One of the possibilities was to investigate whether the hotels' restaurants were able to work during the lockdown through home deliveries, while most of the employees were working from home and the restaurants themselves were closed. The second was the ability to adjust the new safety measurements in hotels that continued to work after lockdowns. The results show that 89.91% of the surveyed hotels have a restaurant, but only 12.84% of those were working during the lockdown, preparing meals for delivery. 28.44% of hotels' restaurants were opened for first guests between 2 and 3 months after the lockdown ended, followed by 22.02% between 3 to 6 months and 49.54% of hotels' restaurants after more than 6 months. The sample distribution regarding first hotel guests was similar: An amount of 23.84% of the hotels opened their doors to welcome their first guests between 2 and 3 months after the lockdown ended, 26.61% did that after 3 to 6 months, and 49.54% after more than 6 months.

Based on the collected data on the hotels that were operating when the survey was conducted, the situation was not favorable: An amount of 17.43% of the hotels were closed for 3 months, 11.01% for 4 months, 20.18% for 5 months, 6.42% for 6 months, and 44.95% for more than 6 months. We tried to identify which safety measures were implemented in the hotels that continued to operate, and the majority had: visible places for disinfection (barriers at the entrance and exit, places for hand disinfection, availability of disinfectants); staff wearing masks and gloves; more rigorous measures and procedures for cleaning and disinfection; chairs in restaurants, bars and common areas set up to respect social distance; plexiglas window at the reception—44.95%; optional cleaning (applies to hotel accommodation—no cleaning, but towels left in front of the room)—43.12%; rooms were emptied at least one night after the previous guest had checked out—18.35%; plexiglas windows in the restaurant between the tables—only 3.67%.

As citizens in our country were not able to travel abroad for the summer season, the majority spent summer holidays in hotels near lakes, rivers, and on mountains, which is the reason for the following: An amount of 22.84% of the researched hotels had more guests during the summer than in the previous years, but 38.53% had fewer guests than previously, and 33.03% did not select any answer. An amount of 88.99% selected that they had fewer foreign guests than in the previous years, and 61.47% selected that they had fewer guests in general than in the previous years. The government program for financial measurement was used by 72.48% of the interviewed hotels; 22.02% did not use it, and 5.50% did not select an answer.

In order to overcome the emergency situation, such as the ongoing COVID-19 pandemic, we investigated whether the staff and the management of the hotels were ready to prepare and overcome such a situation. Bearing that in mind, 63.30% answered that the hotel staff did not show any readiness and willingness to face challenges during and after the COVID-19 pandemic, and 59.63% answered that the management did not show any either. An amount of 80.73% stated that the management should have additional training needed for contingencies and emergency situations, such as epidemics. An amount of 72.48% stated that their hotel had not implemented additional measures in order not to endanger the business since the start of the pandemic, while 80.73% also stated that their hotel did not change its offerings in order to overcome the critical situation. This information shows that hotel facilities are not flexible enough and do not have the ability to adjust to sudden and unexpected situations on the market. Bearing that in mind, the

proposed model for emergency planning and disaster recovery management was created by following the Plan-Do-Check-Act cycle.

4.1. Establishing the Basis of Emergency Planning and Disaster Recovery Management (EPDRM)—PLAN Phase

The planning phase represents the basis of the emergency planning and disaster recovery management model. In order to define the first step of the emergency planning structure, the planning phase was divided into: EPDRM system approach, leadership in EPDRM, risk management policy, planning for recovery management from unforeseen business interruptions, standards and legal requirements for EPDRM, risk management objectives and targets. Questions were divided into these categories and marked with "Yes" (2 points), "Partially" (1 point) and "No" (0 points).

Concerning the first category—the system approach for emergency planning, the average implementation was present in 46.79% of the researched sample, and 20.18% had full implementation of requirements: An amount of 61.93% stated that they had implemented some emergency planning and disaster recovery management system model (whether it was certified or not), and 31.65% stated that this management system had already been described and given in the company's rules of procedure or a similar document.

Since any management system cannot be implemented if the leadership is not present or without its support, the next category—leadership in EPDRM, seems to be highly important in the process approach. The data shows that 30.46% of the researched sample implemented leadership in emergency planning: An amount of 15.96% stated that the management was ready to respond to the challenges of the pandemic and/or any emergency situation; 34.40% stated that the management had communicated with employees about the EPDRM system; 20.64% confirmed that their management appointed a person or a team tasked with the disaster recovery management system; but 20.18% stated that this person or team was not competent for this assignment, and 21.10% stated that EPDRM had been considered in the long-term planning of the organization.

One of the crucial parts of the planning phase is the existence of emergency planning policies that would include statements of intentions and/or principles in relation to the overall EPDRM. An emergency planning policy was present in 32.80% of the analyzed hotels, and 33.49% stated that their hotel had a formal emergency planning policy/statement, while 32.11% confirmed that this policy had been communicated to every employee within the hotel.

Planning for disaster recovery management was present in 30.58% of the researched hotels, but there was not any facility that had fully implemented all the requirements for disaster recovery management planning: An amount of 43.58% stated that their hotel defined strategies for business recovery through the application of specialized technical skills and knowledge, which are necessary for application before, during, and after unforeseen situations; 40.37% recognized that their hotel had defined strategies that included risk mitigation through various uses of facilities and their changes of purpose (their facilities were adapted for different purposes); 37.16% stated that their facilities had a support system that would be upgraded or changed, such as electrical power supply, HVAC system, lighting or others in order to meet facility changes; 24.77% confirmed that they had defined strategies for the protection of data relevant to the organization that included data security in terms of security, validity, and availability to required end users; while 19.72% stated that these strategies defined procedures that considered how to maintain the processes necessary to monitor, operate, and recover the process system in order to meet business requirements, while 17.89% identified procedures within their hotel that consider how to inform and engage all suppliers required for lean operation of the system (to identify all suppliers, inform them, involve them in the process).

For each hotel, legal requirements represent the basis of its operation. In addition to legal requirements that are mandatory, hotels usually choose to apply some non-mandatory requirements (such as standards and norms). In the research sample, 42.35% of the in-

terviewed hotels apply regulations concerning EPDRM, and 2.75% of them have fully implemented requirements for all applicable regulations. Collected data showed that 52.75% of hotels identify and monitor legal requirements (standards, codes of practice, norms . . .) related to EPDRM, and 41.74% stated that these requirements were applied in their processes. It was confirmed that 32.57% monitored the compliance of their business processes with legal and other requirements that are related to the EPDRM system.

Emergency planning management goals represent another step in the planning phase. The goals can be defined as general (objectives that are set globally and applied to the entire organization) or special (targets and/or defined monitored indicators). In the researched hotels in Serbia the average implementation of requirements regarding EPDRM goals is 34.25%, where only 2.75% had full implementation of all requirements: An amount of 45.87% stated that their hotel defined goals for risk reduction and emergency mitigation; 31.19% defined action plans to achieve these goals (defined tasks, resources, deadline, executors), and 25.69% implemented these plans in practice to achieve EPDRM objectives.

As can be seen in Figure 3, which presents the overall Plan phase implementation of the interviewed hotels, full emergency planning was not present in any of the hotels. It is significant that 12.84% of the hotels do not implement some of the emergency planning activities. The average implementation of the planning phase in the interviewed hotels is 34.51%; thus, it can be said that emergency planning exists, but not at a satisfactory level.

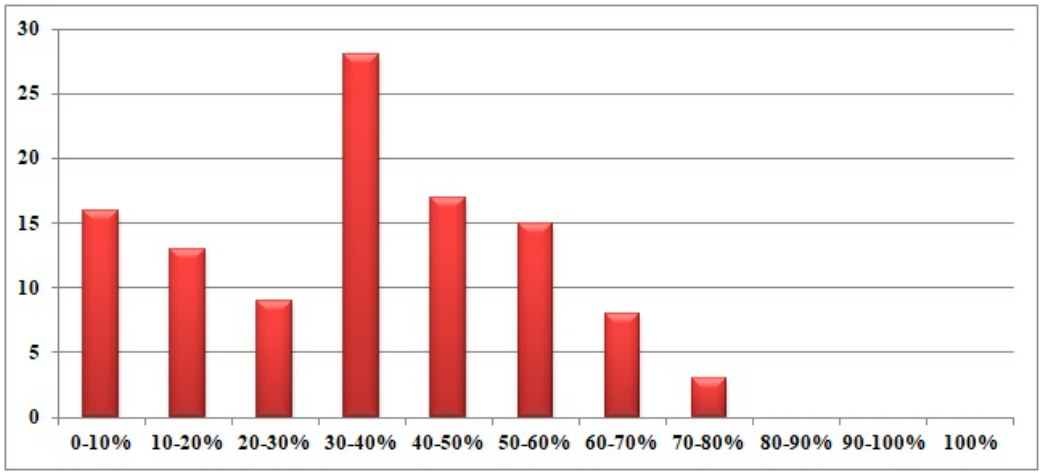

Figure 3. Implementation of the PLAN phase in the researched hotels.

4.2. Implementation of the Emergency Planning and Disaster Recovery Management System (EPDRM)—DO Phase

Having defined EPDRM planning, all planning documents were used as a basis for process implementation. The collected data indicates that the average implementation of requirements for defined plans and strategies for EPDRM application is 30.85%, and that no hotel implemented all these requirements. All the activities cannot be realized without motivation and readiness as well as engagement of employees. Employees represent the crucial part of an EPDRM system implementation, but they can also be an obstacle to full implementation. The research sample shows that 54.13% represents the average level of requirements for employees engagement; there are 20.18% of hotels that have employees that are fully aware and involved in EPDRM, while 16.51% have employees that are not motivated to implement the EPDRM system. It is significant that 64.22% of the researched sample stated that their employees included data on EPDRM methods and strategies in their annual/monthly/weekly reports; while even 59.17% recognized activities of their employees during the working time in which they monitored, measured, documented, or reported on EPDRM at any level; 54.13% had employees that had attended or completed a training course or lecture related to EPDRM, and 38.99% stated that they as the management

had organized training and/or meetings for employees regarding education on emergency management and its significance.

Communication about EPDRM enables the implementation of the previously defined practices. For successful mitigation and overcoming of problems and unexpected situations, as well as for target achievement, communication and reporting within the hotel facility are particularly important. Similarly, external communication is quite important too, in order to benchmark the results with other successful hospitality entities. The average implementation of communication requirements is 51.53%, and 6.42% fully implemented all requirements. According to the hotel facilities: An amount of 64.68% exchange information related to emergency planning and risk management (in meetings, via emails, reports); 51.38% encouraged free communication within the organization regarding the EPDRM system, and 38.53% encouraged their employees to give suggestions and comments to improve emergency planning in a certain process.

To have proper management of a documentation system, it is important to have an insight into the documentation that can provide guidance and procedures on how to implement activities, as well as documentation that would serve as proof of implemented activities or targeted achievements. Both groups are important in providing a hotel with full insight into the processes. Collected data indicates that the average implementation of requirements regarding the documentation system is 44.72%, and 15.60% of the interviewed hotels had full implementation. It is significant that even 53.21% of the researched sample stated that they managed a documentation system related to EPDRM, such as plans, procedures, reports, activities, instructions, while 36.24% had clearly defined procedures for documentation management that was somehow related to EPDRM. This clearly indicates that the hotels were aware of the importance of documentation systems and had already defined procedures regarding documentation. There are hotels within the sample that implemented some management systems where they were obliged to have a documentation system developed and implemented, but this analysis will be presented in the next section.

For proper functioning of any management system, it is necessary to have a fully defined and well controlled critical process within the hotel facility. This process approach should include all user-supplier relationships, all data regarding inputs and outputs of a certain process and needed resources as well. For this research it was important that the management should recognize the processes that are critical for any risk that may occur, so the average implementation of the process approach is 46.33%. According to the surveyed hotels: An amount of 60.55% were aware of the processes that significantly increased the risk and the inability to maintain business continuity; 50.46% could identify the processes in which it was possible to reduce the risks (risk situations) without compromising the operation; 27.98% had clearly defined procedures related to the operation and equipment maintenance in significant processes (i.e., in processes that were considered to significantly affect the risk occurrence, supply distribution, IT system disruption, etc.).

Besides the process approach, the process design such as material and energy flow is quite important for proper management of processes. Bearing that in mind, the last category for the DO phase is designing, and in 31.80% of the surveyed hotels the requirements regarding the design of the process flow were implemented. The hotels stated that 57.80% considered designing the layouts, installations, equipment, processes, or their modification to have an impact on increasing the risks in the business process; 22.94% had existing projects of layouts, installations, equipment, processes that enable change in the functions of the rooms, halls, as well as processes if necessary; while only 14.68% had a team within the hotel that should be engaged in projects of upgrading, modifying or improving existing projects of rooms layout, installations and equipment (such as electricity, cooling, heating, lighting, etc.).

As it can be seen in Figure 4, which presents the overall implementation of requirements of the DO phase in the research sample in Serbia, there is no full EPDRM implementation in any hotel. The average implementation of the DO phase of the interviewed hotels

is 40.85%, which indicates that the implementation of EPDRM is evident, but should be at a higher level.

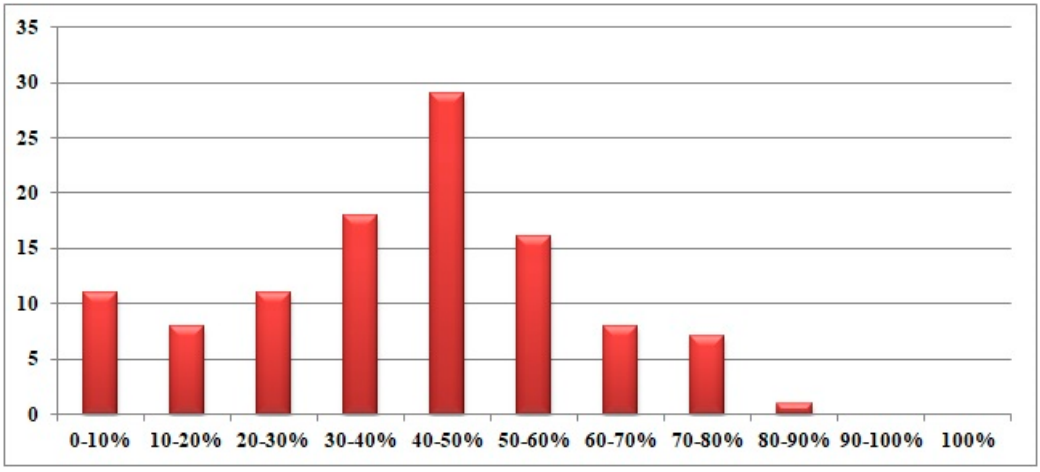

Figure 4. Implementation of the DO phase in the researched hotels.

4.3. Fact-Based Decision-Making on The Emergency Planning and Disaster Recovery Management System (EPDRM)—CHECK Phase

Fact-based decision-making represents one of the quality management principles. It is considered that management should base decisions on facts while there is an appropriate system for data collection and processing that would be used for data comparison and further analysis [57,63,64]. Without decisions in the requirement management system, it is not possible to implement any of the defined plans and achieve goals and targets.

In this category, the surveyed hotels stated that 49.08% followed the development of new devices, systems, equipment that have better performance and are safer and more reliable than those of the older production date; 33.49% had a person within the hotel who dealt with monitoring, recording, and reporting on the risk and emergency occurrences and possibilities for avoiding them; 33.03% had a record of any significant accidents or deviations related to reliable and safe procedural activities, including the reasons for their occurrence; 19.27% of hotels defined corrective actions and plans that are in relation to the current risk and emergency planning management (on a quarterly or annual basis); and 17.43% defined the preventive measures, actions and/or plans related to the EPDRM system.

As can be seen in Figure 5, which presents the overall implementation of the CHECK phase in the research sample, full fact-based decision-making is not present, and an extremely low implementation of requirements within this phase is found in 41.28% of the researched hotels. The average implementation of the Check phase in the researched sample is 30.46%, which is quite low and indicates that checking and monitoring of EPDRM should be more evident and present.

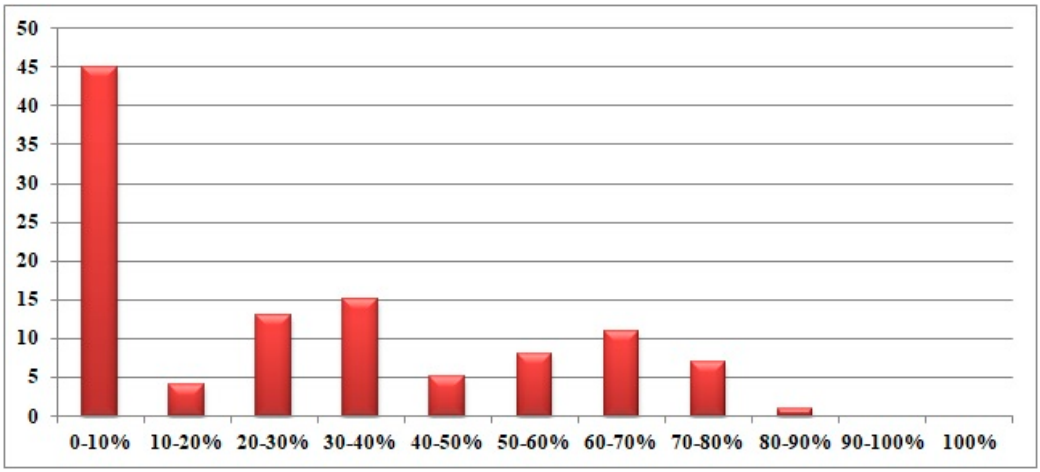

Figure 5. Implementation of the CHECK phase in the researched hotels.

4.4. System Review and Continual Improvements of the Emergency Planning and Disaster Recovery Management System (EPDRM)—ACT Phase

Establishing an emergency planning and disaster recovery management system is followed with internal audits and reviews of the top management. It is considered that the ACT phase represents an opportunity to gain full insight into the implemented management model and to propose solutions and improvements that can have an impact on better performance.

The category for system review and continual improvement depends on the top management's readiness to implement all possible improvements and to make this approach even better. The survey results indicate: An amount of 35.78% of the interviewed hotels implemented internal audits for the EPDRM system, which were recorded (periodic, annual audits of the established management system); 22.94% had a plan and scheduled internal audits for the EPDRM system; in 18.35%, the management defined plans and actions for the next period, which would improve the process of providing services in terms of the EPDRM system; while 13.76% reviewed their management, and their decisions related to the EPDRM system.

As it can be seen in Figure 6, where the overall implementation of the ACT phase is presented, there is no full implementation of requirements for system review and continual improvement in any organization, and very low implementation is evident in 38.53% of the interviewed hotels. The average implementation of the ACT phase is 22.71%, which indicates that the EPDRM system review and improvement are not widespread enough.

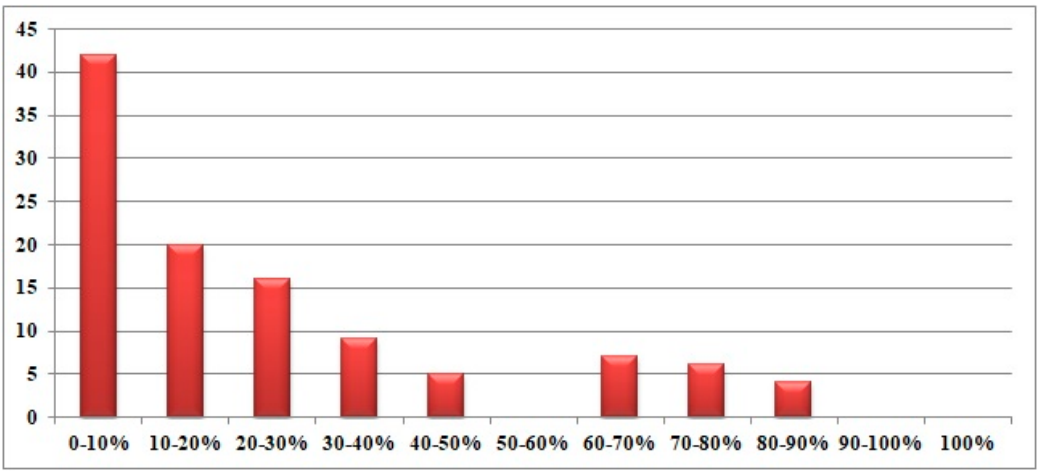

Figure 6. Implementation of the ACT phase in the researched hotels.

4.5. Analysis of the Correlation between the Emergency Planning and Disaster Recovery Management System (EPDRM) and Hotel Properties

Further analysis uses the basic hotel properties, collected through the first part of the questionnaire, so as to investigate the correlation between the implementation of the EPDRM requirements and certain hotel properties.

The Mann-Whitney U test was used to analyze whether the hotels that had implemented and certified a quality management system, implemented the EPDRM system to a higher level. The implementation level of the EPDRM system requirements in hotels that already had a quality management system in place (median Md = 50.78%, n = 44) is significantly higher than in those that did not have any certified or implemented systems (median Md = 22.49%, n = 65). The z-score is 8.42105, and the p-value is p = 0.00001. The results of this analysis show that there is a significant difference between these two groups. Similar results were also presented in [60,61], but regarding the energy management system. Specific Hypothesis (H1) was therefore confirmed with evidence.

The number of employees in the researched hotels could possibly influence the implementation level of the analyzed EPDRM system. For this purpose, the Kruskal-Wallis test was used. The results show that the implementation level of the EPDRM system requirements is higher in large hotels (median Md = 72.10 %, n = 2) than in the medium-sized (median Md = 47.80 %, n = 32) and small organizations (median Md = 32.60 %, n = 34). The minimal level of application of EPDRM is in micro-organizations (median Md = 17.60 %, n = 41). Test value X2 = 61.5301 and p-value $p < 0.00001$ show that the result is significant for $p < 0.05$. Specific hypothesis (H2) was also confirmed. Previous studies [62,63] that analyzed the level of application of certain management systems in dependence on the organization size also indicated that the organization size definitely had an influence on the application level of the management system.

Similarly, to this, the analysis which takes into account the influence of national categorization on the application of the EPDRM system requirements was also performed. For this analysis the Kruskal-Wallis test was used. The results show that a higher level of the EPDRM system application is evident in hotels with 5-star national categorization (median Md = 58.82%, n = 11), in comparison with 4-star (median Md = 41.18%, n = 87) and 3-star hotels (median Md = 15.68 %, n = 11). Test value X2 = 19.9405 and p-value $p < 0.00005$ show that the result is significant for $p < 0.05$. These test results indicate that the categorization certainly determines and influences the level of the EPDRM system application. General hypothesis (H1) was confirmed with regard to the existence of a significant relationship between the EPDRM system requirements application and the level of a hotel's development.

5. Discussion of Results

The presented analytical results show that the level of application of the emergency planning and disaster recovery management system in the hotel facilities in Serbia, in line with the third part of the survey, is in the range between 0 and 102 points, the latter being the maximum number of points that hotels could achieve, according to the categories presented in Figure 2. The average points scored by the researched hotels are 36.51. The presented research had a goal to investigate the emergency planning, as well as disaster recovery management in situations during and after actual disasters, such as the COVID-19 pandemic, which has had a huge impact on business, especially in the hospitality industry. Bearing in mind that the majority of the hotels and restaurants were closed during the investigation, the collected data is considered to be important since it not only shows the results directly after the pandemic began, but also presents the state of the hotels that took the survey that were the ones that 'opened the door' after this disaster first occurred. Most of the hotels surveyed demonstrated a low level of application of EPDRM, with an average score of only 35.80%. The hotels in Serbia generally have a systematic approach to EPDRM, which should be on a higher level. The results also point to the fact that there is a willingness of the management to implement this management system, and

emergency planning is certainly present in the researched facilities, but the level at which the requirements of disaster recovery management planning are implemented is low. This data certainly defines the current situation following the end of the lockdown caused by the pandemic. The documented system and employees' engagement and communication about EPDRM is evident, yet it should be improved.

As can be seen from the histogram in Figure 7, 85.32% of the hotels have a requirement for the EPDRM system application below 50%, which is the vast majority of the hotels in the research sample. The full implementation of requirements for this management system was not found in any organization, and a very low implementation level of only 16.51% is present throughout the sample. The presented data should be monitored in the future period, especially when this pandemic crisis is over. The model was based on the Plan-Do-Check-Act cycle but developed specially for the hospitality sector and with the requirements regarding the pandemic situation.

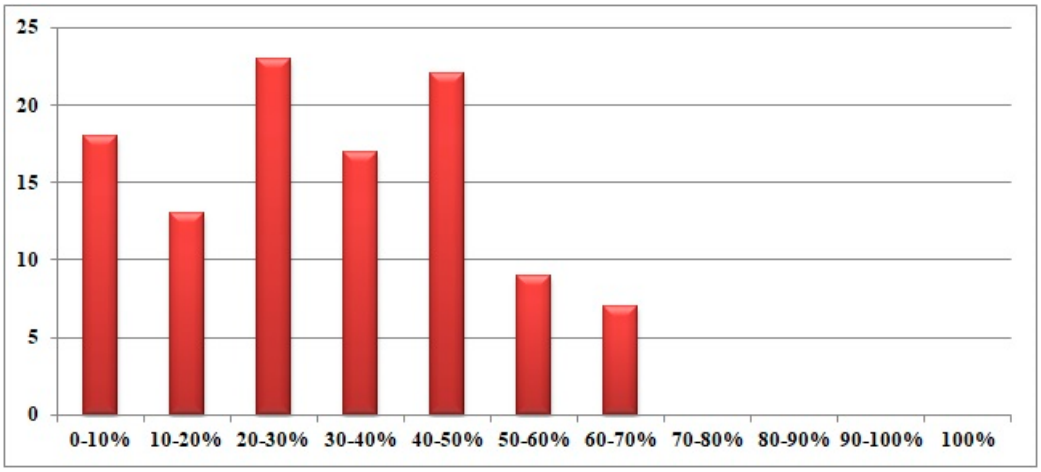

Figure 7. Implementation of the emergency planning and disaster recovery management system in hotels in Serbia.

Limitations of the Study

This study was limited to a relatively small research sample, and the majority of the surveyed hotels belong to small and micro hospitality enterprises (fewer than 10 employees) in Serbia, which may neither be representative of all small hospitality enterprises in Serbia nor worldwide. The majority of the analyzed hotels are family-owned and operated businesses, with limited financial resources, which may affect the results of this research. It is important to emphasize that the study limitations can also be identified in the insufficient cooperation from the contacted hotels as well as the lack of willingness on the part of the hotels' managements to participate in the study.

6. Conclusions

The presented results indicate that the average hotel in Serbia can be described, in terms of the emergency planning and disaster recovery management system, as follows: the emergency planning system approach is not sufficiently implemented; hotels' top management is insufficiently committed to disaster recovery management; the emergency planning policy should be more present, while the disaster recovery management policy is not defined; the legal requirements for EPDRM are mainly applied, but that is not the case with the standards; the objectives and targets for EPDRM are defined, but their implementation is not often documented; communication on this management system is considered to be not frequent but on a regular basis; employees should be more engaged; the documentation system exists but it should be on a higher level; processes are considered to be well known and predicted, especially with regard to their influence on the risk and

emergency planning management; project plans are familiar and new projects can be easily implemented in order to avoid any unforeseen circumstances.

Based on the presented model, the average level of the implementation of emergency planning and disaster recovery management requirements in the hotel industry in Serbia is 35.80%. The highest level of implementation (80–100%) was not found in any of the analyzed hotels in the sample. The average implementation of the Plan phase is 34.51%; the implementation of the Do phase is 40.85%; the implementation of the Check phase is 30.46%; the implementation of the Act phase is 22.71%. Also, it was shown that the hotels that have a certified quality management system (ISO 9001) have a higher level of implementation of the emergency planning and disaster recovery management system. The analysis showed that large and medium-sized hotels have a higher level of implementation of these requirements, which is also true for 5-star hotels compared with 3-star ones (according to the national categorization).

While performing this study, the authors identified that it is necessary to make efforts to raise awareness and educate hotels' managements on the requirements and benefits of EPDRM. There is a necessity to introduce education at the state level in order to provide information regarding emergency planning. It is evident that the majority of hotels are not aware that the implementation of EPDRM does not require significant financial resources, but only the engagement of personnel. Management responsible for emergency planning should be trained to properly collect, process, and analyze data in order to provide proper decision-making support. It is necessary to introduce a training system at the organizational level for each responsible manager at specific hotels, with award points that would affect a manager's salary, or even employment. The proposed reward system would require regulation at the state or regional level, to provide accreditation of training and definition of points awarded per training. It is specifically important to introduce a model to motivate hotels' employees that should also be integrated into the training system at a state/regional level.

This research represents the approach for identifying the level of implementation of the emergency planning and disaster recovery management model, with the classification algorithm by using analytical tools. The proposed model can also be implemented in other sectors or in different industrial environments and conditions.

The future research should include other sectors in the hospitality industry in order to have fuller insight into the readiness of different entities to mitigate the current crisis and overcome all possible obstacles in business. The results of such a study would provide more accurate and reliable results that would help policy-makers and enable top-management in this sector to formulate a more strategic approach.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/su15076303/s1.

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