

ENHANCED USER EXPERIENCE IN DATA MONITORING VIA MICROSOFT SHAREPOINT AND POWER BI

Muhammad Norashid Hakimmi Bin Rashidi^{*1}, Alia Binti Abdullah Salleh², Seri Bunian Binti Mokhtar³, Mariah Binti Awang^{*1}, Kamarul Aini Binti Sari¹

¹, Department of Civil Engineering Technology, Faculty of Engineering Technology, University Tun Hussein Onn Malaysia (UTHM), Pagoh Education Hub, 84600, Johor, Malaysia

², Department of Built Environment Studies and Technology, Faculty of Architecture, Planning and Surveying, Universiti Teknologi MARA Perak Branch, 32610, Seri Iskandar, Perak, Malaysia.

³, Department of Civil Engineering, Politeknik Ungku Omar, Jalan Raja Musa Mahadi, 31400 Ipoh, Perak, Malaysia

*Corresponding Email: kimmirashidi@gmail.com, mariah@uthm.edu.my

ABSTRACT: The study that was carried out aimed to examine the important and suitable data parameters with workers in facility management fields and to propose a new technique integrating digitalized data for a few facility management companies in Malaysia. The new parameter that was proposed was to use Microsoft SharePoint and Power BI. Microsoft SharePoint offered the ability to track both major and minor document version changes. To enforce versioning and handle changes cleanly, libraries could be set to require users to check documents in and out when making changes to content. Some parameters for Microsoft SharePoint included its ability to run in the cloud with Microsoft Office 365, allowing for easy sharing of content and information across multiple places and devices. On the other hand, Microsoft Power BI simply and effectively designed and showed data analysis and presentations. In addition, it enabled the creation of reports at a fraction of the cost of more conventional systems and with far less rigidity and overhead. Parameters for Microsoft Power BI included choosing the right visualization type, customizing visualization properties, considering custom visualizations, and removing unnecessary elements in high-density reports. The study was conducted using two methods, namely quantitative and qualitative. For the quantitative method, a questionnaire approach was used, with the questionnaire distributed to several employees in the field of facility management in Malaysia. The qualitative method used an interview approach with several employees in the facility management field who were selected based on the questions. After the distribution of questionnaires, it was found that some companies or facility management work fields still used manual methods in recording their data. Some respondents had also used CMMS or advanced software but agreed with the method that had been suggested to them. The result of the first objective was the ability to understand that there were many parameters that were important for data documentation in the FM sector. Regarding the second objective result, it was observed that the majority of respondents who had completed the questionnaire agreed with the idea of proposing a new parameter to integrate digitalized data for a few facility management companies in Malaysia.

Keywords: *Computerized Maintenance Management System, Facility Management, Microsoft SharePoint, Microsoft Power BI*

1. Introduction

The basis of FM is the idea that every organization's productivity is influenced by the physical setting in which it functions and that this setting may be enhanced to boost productivity. This has grown in importance as a component of the built environment (1). Facilities management

involves the coordination of various services, such as maintenance, security, and cleaning, to ensure that a building or facility is running smoothly. It also involves the management of resources, such as energy and waste, to reduce costs and improve sustainability. With the growing importance of environmental sustainability, facilities management has become

a crucial aspect of building management and operations. As such, facilities managers are now expected to have a broad range of skills and knowledge, including technical, financial, and environmental expertise.

2. Problem Statement

FM has been effectively established in Western nations including Singapore, Hong Kong, Australia, New Zealand, and Japan. It is acknowledged in these nations as a practise that may improve management of the buildings, services, and related staff in support of an organization's strategic objectives (2). The second part of the 1990s marked the beginning of FM development in Malaysia. The growth of FM in Malaysia has been significantly influenced by the government. The non-clinical support services at government hospitals were privatised by the government in 1996 and were given to three FM businesses. Since then, Malaysia has given the growth of FM, particularly in the public sector, a lot of attention and effort. Encouragement for addressing Facility Management problems and challenges is being carefully considered for better realisation. The ultimate implementation will also include a proper and more organised monitoring of facilities. For higher Facility Management performance in Malaysia, a holistic strategy to combining effort and collaborative accountability is currently the major agenda item (2).

3. Objective

To examine the important and suitability data parameters with worker in facility management fields.

To proposed a new parameter integrated digitalize data for a few facility management company in Malaysia.

4. Method

Although there is disagreement over what defines a research technique and how to classify research methods, they are used in all types of investigations. In the field of library and information science, more than 1900 research articles were gathered from three main publications published between 2001 and 2010. Using a schema of research methodologies devised in this study, each chosen article was

coded. Both a qualitative and a quantitative analysis of the coded data and associated publications was conducted. This investigation demonstrates that research methodologies include procedures for gathering data (such as interviewing, observing), as well as ways for analysing that data (such as qualitative, quantitative). It would make more sense to group research techniques according to the method used to acquire the data than to categorise them as qualitative or quantitative (3)

This study employed two methods, namely quantitative and qualitative. The quantitative method involved the distribution of a questionnaire to several employees in the FM sector, with a total of 31 respondents providing answers. The qualitative method utilized an interview approach with various individuals, including FM employees, FM managers, and employees in the ICT field. The questions for the interviews were reviewed by several UTHM academic staff before the interview sessions to ensure appropriateness and alignment with the study's objectives. After analyzing the data from the interview sessions, questions for the questionnaire were designed based on the insights gathered during the interviews.

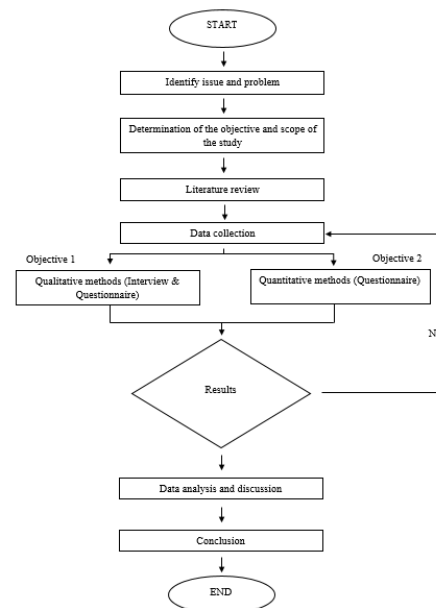


Figure 1 Flow Chart

4.1 Quantitative

Quantitative research works with analysing and quantifying factors to get outcomes. It entails

the use of numerical data and statistical tools to analyse that data in order to provide answers to queries like who, how much, what, where, when, how many, and how. It also outlines how to obtain facts in numerical form to explain a problem or phenomena (4). Additionally, the systematic nature of quantitative research enables researchers to test hypotheses and draw generalisations about a population. In order to measure variables and examine their interactions with one another, it includes gathering data using surveys, experiments, or other quantitative techniques. These kinds of studies are frequently conducted in disciplines like psychology, economics, and sociology where the goal is to comprehend intricate social phenomena and human behaviour. Despite its advantages, quantitative research does have certain drawbacks that should be taken into account while analysing its results.

4.1.1 Questionnaire

Questions were distributed to employees in the field of facility management because this study focused solely on the field of facility management. The positions within the organization in facility management that were chosen also played important roles because different positions had different work scopes, providing diverse perspectives on the research conducted. Likert scale questions were used for the questionnaire distributed to the respondents.

4.1.2 Cronbach Alpha

To ensure the applicability of this study, Cronbach's Alpha test should be conducted to ensure that this study is applicable. According to (5), the internal consistency or dependability between a number of items, measurements, or ratings is measured by the Cronbach's alpha statistic. In other words, it calculates how accurately the results of a survey (or a section of a survey), an instrument, or a rating given by participants will reflect the consistency of the tools.

Therefore, the requirements in Table 1 for interpreting Cronbach's Alpha values for dichotomous questions (i.e., questions with

two alternative responses) or Likert scale questions.

Table 1 Criteria Cronbach's Alpha value.

Cronbach's Alpha	Internal Consistency
$\alpha \geq 0.9$	Excellent
$0.9 > \alpha \geq 0.8$	Good
$0.8 > \alpha \geq 0.7$	Acceptable
$0.7 > \alpha \geq 0.6$	3
$0.6 > \alpha \geq 0.5$	1.25
$0.5 > \alpha$	1

4.2 Qualitative

In tracking unusual or unexpected events, illuminating the experience and interpretation of events by actors with widely divergent stakes and roles, giving voice to those whose opinions are rarely heard, conducting initial explorations to develop theories and to generate and even test hypotheses, and moving towards explanations, qualitative research methods are valuable. Quantitative and qualitative techniques can be applied sequentially, simultaneously, or in combination. The greatest qualitative research is methodical, thorough, and looks for evidence that contradicts the initial or emerging hypothesis. It also aims to minimise prejudice and mistake (6). Qualitative research can be particularly helpful when examining complex social phenomena like behavioural, attitude, and belief patterns in people. It enables researchers to understand these phenomena in great detail as well as the perspectives of the people involved. Additionally, qualitative research frequently uses techniques like observation, focus groups, and interviews to gather data. These techniques can offer detailed and nuanced insights that may be challenging to obtain using only quantitative techniques. Overall, qualitative research is crucial for exploring the complexities of the human experience and developing new theories and insights. While quantitative research is important for providing statistical evidence and measuring outcomes.

4.2.1 Interview

An interview session was conducted to gain certainty from experts in the field of facility management. The selection of experts in this field was assessed first to obtain strong and capable

data supporting the title of this study. The questions that were asked also focused more on the experts' views of the research topic that had been prepared. This interview session was conducted to further strengthen the data for this study. Those experts who had extensive knowledge and experience in facility management were chosen for this interview session. They were selected based on their levels of education, professional backgrounds, and contributions to the field. The goal was to assemble a diverse group of subject matter experts who could offer various viewpoints and insights on the research topic. Open-ended questions were used in the interviews to entice the subject matter experts to share their insights and experiences. This made it easier to collect rich, thorough data that supported the findings of the study.

4.3 Results and Analysis

This section discuss the results of a study that has been carried out on employees in the field of facility management as many as 31 respondent from various companies and factories.

Data from the respondents was gathered, and the conclusion of this study was reached after its analysis. Based on the information acquired, the data was summarized, and the analysis was provided in depth. The success or failure of this study was determined by its goals and objectives.

SPSS, Microsoft Excel, and interviews were all used in the analysis of the data gathered from respondents. The Microsoft Excel application applied the necessary statistical macro procedures before displaying the outcomes in an output table. In addition to producing output tables, some technologies also provided charts (7).

Additionally, there were several ways to interpret the survey results in this study. The amount of agreement demonstrated by respondents who completed the surveys determined how the questions in Parts 2 and 3 were ranked on a variable. Calculating the frequency, percentage, and mean of the answers to the questions was done. Respondents had to select an option that was pertinent to the topic or submit replies on a scale. To achieve the goals of the research, these were required. The following chapter went into further detail on this data and analysis.

4.3.1 Reliability Test

Based on Figure 2, the total number of respondents who have been selected to answer the questionnaire is 31 respondents. According to Cronbach (5), the internal consistency or dependability between a number of items, measurements, or ratings is measured by the Cronbach's alpha statistic. In other words, it calculates how accurately the results of a survey (or a section of a survey), an instrument, or a rating given by participants will reflect the consistency of the tools. As a result of the reliability test conducted, this study has obtained a value of 0.96 and based on Table 4.1, the Cronbach's Alpha criterion at a value of 0.9 has achieved Internal Consistency at the Excellent level. With this it can be said that this study has been successfully conducted.

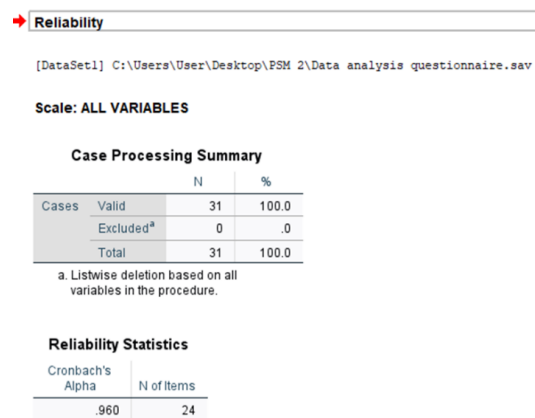


Figure 2 Reliability Test

4.3.2. Respondent Working Experience

Based on Figure 3, 10 out of 31 experienced respondents worked for less than 1 year in the field of facility management. 8 respondents had experience for 1 to 3 years in this field. 5 respondents have 3 to 5 years of experience and 8 respondents have worked for more than 5 years. This can show that the views from each level of work experience have been taken into account because each employee's view is different and this view can help in achieving the purpose of this study.

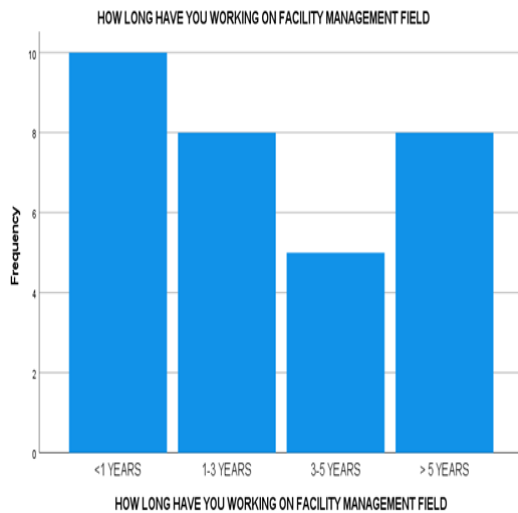


Figure 3 Working Experience

4.3.3 Respondent Position

Based on Figure 4, it can be seen that the respondents who answered the distributed questionnaire came from various positions in facility management. This position also helps this study to be carried out as best as possible because each position does a different field of work and can indirectly collect different opinions from each position's point of view on that one facility management.

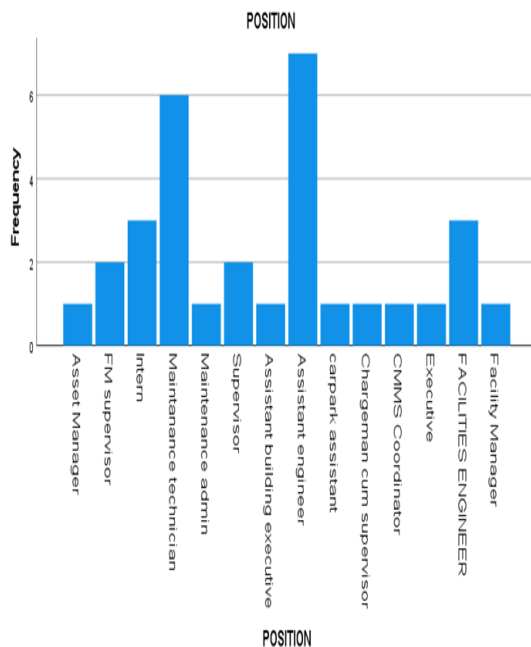


Figure 4 Position

4.3.4 Data Currently Monitored and Managed in respondent Facility Management Operations

Based on Figure 5, it can be seen that various CMMS or software are used in the respondent's facility management sector, but there are also facility management respondents who still use manual methods. However, there are also facility management respondents who state that they use manual methods but are in the process of changing their work methods to the use of CMMS or software capable of tracking costs and any maintenance work.

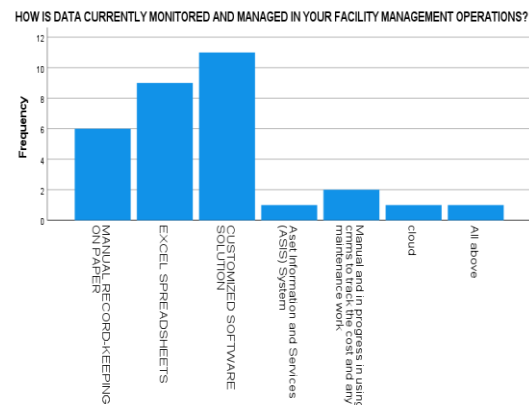


Figure 5 Data Currently Monitored And Managed In Respondent Facility Management Operations

4.3.5 Microsoft SharePoint

Based on Figure 6 it can be seen that a total of 9 respondents chose strongly and 12 respondents chose agree stating that they agree that Microsoft SharePoint is more to data management. While a total of 3 respondents chose to disagree and only one chose to strongly disagree stating that Microsoft SahrePoint is not more to data management. According (8) SharePoint offers the ability to track both major and minor document version changes. To enforce versioning and handle changes cleanly, libraries can be set to require users to check documents in and out when making changes to content.

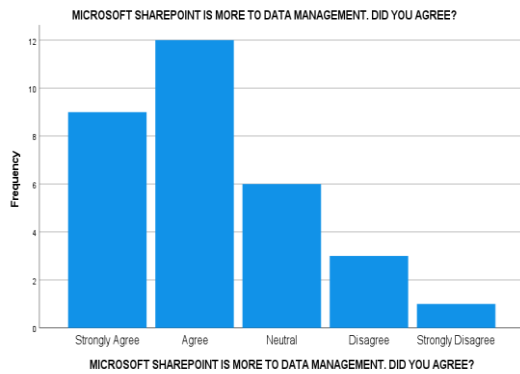


Figure 6 Microsoft SharePoint

4.3.6 Microsoft Power Bi

Based on Figure 7 it can be seen that a total of 8 respondents chose strongly agree and 7 respondents chose agree. This shows that they agree that Microsoft Power BI has capabilities for data visualization analysis. However, there are also respondents who do not agree with this statement where a total of 2 respondents have chosen to disagree and one has chosen to strongly disagree. 13 out of 31 respondents chose neutral. According (9) Microsoft Power BI which transforms how data is found, recorded, organized, and shaped so that it can be queried, sliced, diced, and presented in a very visual and interactive manner.

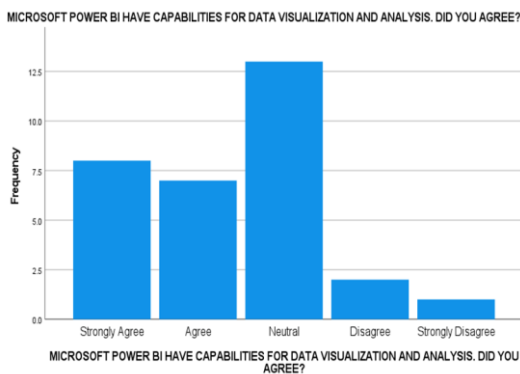


Figure 7 Microsoft Power BI

4.3.7 Opinions on Implementing Microsoft SharePoint and Power BI

This section focuses on the respondents' views on implementing new methods in their facility

management. There is a positive stimulus where the average respondent agrees with implementing a new parameter integrated digitalize data for a few facility management company in Malaysia. Because there are still some FM sectors in Malaysia that still use non-online data storage methods.

Based on Figure 8 it can be seen that a total of 6 respondents chose strongly agree and 14 people chose agree. This can show that with the implementation of this method can help respondents in real-time data visibility and tracking. Figure 9 shows that 5 respondents chose strongly agree and 12 respondents chose agree. By evaluating the rate of respondent selection, it can be ascertained that the average respondent agrees that the proposed method can help them in enhanced data analysis and reporting capabilities. Figure 10 discusses that the proposed method can help respondents in streamlined and automated data collection processes. A total of 8 respondents chose strongly agree and 10 chose agree and this shows that they agree with the statements that were asked of them. Next Figure 11 has shown a total of 5 respondents choose strongly agree and 13 respondents choose agree where it can be stated that the respondents agree with the proposed method that can help their facility management department in improved data security measures. Finally, Figure 12 discusses the statement regarding the integration of data from multiple sources where a total of 4 respondents chose strongly agree and 10 respondents chose disagree. This shows that the respondents agree with the statements that have been given to them.

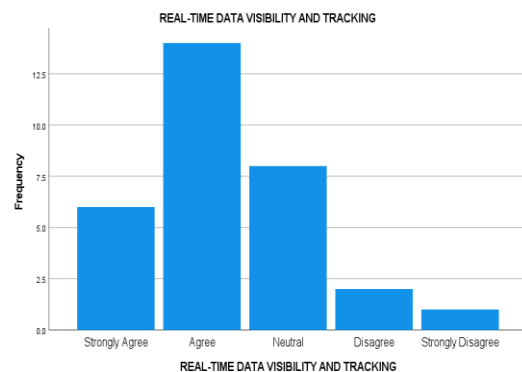


Figure 8 Real-Time Data Visibility and Tracking

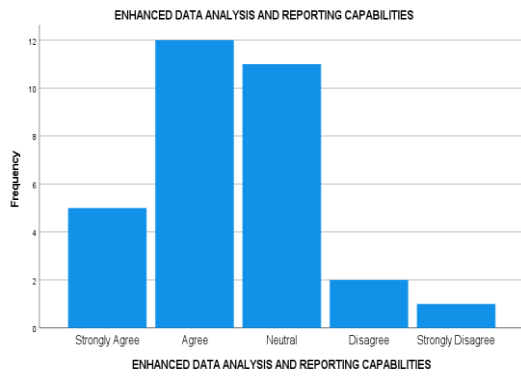


Figure 9 Enhanced Data Analysis and Reporting Capabilities

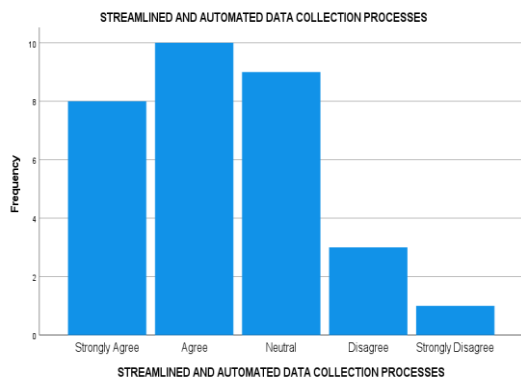


Figure 10 Streamlined and Automated Data Collection Processes



Figure 11 Improved Data Security Measures

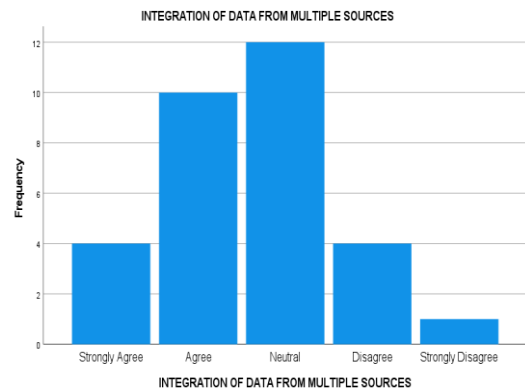


Figure 12 Integration of Data from Multiple Sources

5. Conclusions

This study can help some FM sectors in Malaysia that still use data documentation manually and offline. Researchers may also comprehend the parameters that need to be present for a data document for some FM sectors that have switched to online systems and also FM sectors that still maintain the traditional method which is offline. Once the researcher understands the important parameters then propose new parameters can be proposed to the FM sector which is still using the offline method.

Acknowledgement

The authors would like to extend their sincere gratitude and appreciation to Faculty of Engineering Technology, University Tun Hussein Onn Malaysia (UTHM) and workers in the field of facility management. For their invaluable contribution of knowledge and expertise, which greatly assisted in the successful completion of this research.

References

- [1] Amaratunga, D., Baldry, D., & Sarshar, M. (2000). Assessment of facilities management performance – what next? *Facilities*, 18(1/2), 66–75. [https:// www. researchgate.net/publication/235267201_Assessment_of_facilities_management_perfor mance_-_What_next](https://www.researchgate.net/publication/235267201_Assessment_of_facilities_management_performance_-_What_next)

- [2] Syahrul Nizam Kamaruzzaman. (2018). Development of facilities management in Malaysia. <https://www.emerald.com/insight/content/doi/10.1108/14725961011019094/full/html?fullSc=1>
- [3] Heting Chu. (2017). Research Methods: What's in the Name? <https://www.sciencedirect.com/science/article/abs/pii/S0740818816302274>
- [4] Bus Manag (2017) Quantitative Research Methods: A Synopsis Approach. (n.d.) . Al Manhal Platform. <https://platform.almanhal.com/Files/Articles/107965>
- [5] Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. <https://link.springer.com/article/10.1007/BF02310555>
- [6] Sofaer, S. (1999). Qualitative methods: what are they and why use them? <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1089055/>
- [7] Dr. Hossein Arsham. (2020). Excel For Statistical Data Analysis. https://www.researchgate.net/publication/344638517_Excel_For_Statistical_Data_Analysis
- [8] Chris Geier. (2011). SharePoint 2010 Six-in-One https://books.google.com.my/books/about/SharePoint_2010_Six_in_One.html?id=MPBcTaMhoKwC&hl=en&redir_esc=y
- [9] Adam Aspin. (2016). Pro Power BI Desktop <https://www.scribbr.com/citation/generator/folders/3MYsZn4AY02eaou2nAk2zW/lists/2ddOo4tvbnr84CUWXIUvlw/>