Determination of the causes of the Construction Delay in Higher Learning Institutions in Malaysia Using The Rasch Model Analysis

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Abstract: The development of an infrastructure requires a planned and effective construction management including the construction of the university. To obtain a good ranking, the universities should provide comprehensive physical facilities and infrastructure. This study is to investigate the construction process to know the causes behind the delay process in constructing the high education facilities in the Malaysian universities. The Rasch model technique is applied to analyse the results, and the sample of this study included 100 respondents where the majority are managers and owners of the construction of the high learning institutions. The delay causes are grouped into three factors, there are input factor, internal factor and exogenous factor. It is revealed that internal factors were the most factors that contribute in delay construction process, the factors as follows: poor monitoring by the contractor, lack of consultants experience, changes in design, too many variation orders by owner, delay in making decisions by project owner.

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1. Introduction

The construction industry is a benchmark for economic growth for other sectors, it will be a boost to the economic growth, with the existing building. Although the Gross Domestic Products (GDP) of the construction sector is the lowest compared to other major sectors after manufacturing, mining, and agriculture, it does not adversely affect the construction industry but in fact, has increased the number of the construction projects over the years. The CIDB statistics show the rising number of construction projects in Malaysia from 2006 to 2012 and the maximum number of building projects registered in 2011 totalling 95 882 million Malaysian Ringgit (Construction Industry Development Board Malaysia 2011).

Construction is a process that consists of the installation of the building and/or infrastructure development (Alnaser and Flanagan 2007). A construction project consists of various activities within a time (Menesi 2007) and requires skilled workers and unskilled workers from various fields (Hilton et al. 2003). To achieve successful implementation of the project, effective planning is essential (Shi et al. 2010). An effective project is measured in terms of customer satisfaction, planning defect, profit, interest or value for currency and the non-existent legal provisions and proceedings (Takim and Adnan 2008). Although the scheduling and planning of construction projects have been laid out, many things can happen due to various uncertainties and volatility during the construction period (Divakar and Subramanian 2009).

Delays often occurring in construction projects are normally difficult to avoid (Assaf and Al-Hejji 2006). Often the implementation of a construction project is led by the contractor, and the person responsible for managing the construction site is the project manager. Therefore, a less experienced project manager may run the risk of making bad decisions and endorsing improper implementation (Kumar and Navaneethakrishnan 2012) and this can easily lead to various problems.

Experienced project leaders in the construction sector can play the games of managing the project more effectively and further creating success of the project (Ko 2010). A construction project manager must develop appropriate methods to evaluate and resolve any problems that occur on the construction sites (Randa S.M et al. 2009). However, the manager will instead be led to have to delay a construction project under his responsibility. The objective of this study is to review the main causes that contribute to the delay in construction projects in Malaysian higher education institutes.

This research study area is confined to the higher learning institutions in Malaysia. This is done to facilitate the construction of the project or research which has to focus on the many causes of delay that is very much commonplace in Malaysia. This is because the delay can leave an impact to relevant parties, such as building up pressure on the implementation of construction projects, especially contractors. When a project has suffered from delays, the contractor will have to accelerate or add provisions in the specified time (Dayang Sabariah Safri 2009) and this will lead to reduced quality of work due to the increase in costs.

2. Significant of study

University is the place where human resources graduate and validate their knowledge of expertise, and for this, good, well-planned buildings that are conducive to the learning and education processes need to be constructed. The well planned building will contribute to the success of education process inside the high learning institutions in Malaysia. The function of these facilities is established for teaching and learning activities. So that the knowledge transfers in various fields will contribute to the economic growth for Malaysia. In Malaysia, the higher learning institutions (HLI) have to compete among themselves to achieve good ranking, either nationally or internationally. To achieve a good ranking, not only the academic and research aspects, the facilities provided by the university are also an important requirement. The facilities can be seen in its accommodation of the number of student and provision of the best facilities to enhance the teaching and learning processes and to encourage research development. Thus, the physical development of the universities must be strictly monitored, and the construction processes must run smoothly with the minimum time of delay.

3. Literature Review

The construction industry is subject to more risk and uncertainty than any other industries. Construction projects tend to involve complex and time-consuming designs. The processes of construction are also characterized by unforeseen circumstances (Acharya et al. 2006). As a result, the effect risk management has become a major problem that has to be confronted by the industry. Construction delay has been considered as a major risk as well as the source of dispute in various literature, therefore, knowledge and the understanding of risk of delay are important to help identify and manage the risks effectively and systematically to achieve the project objectives according to the expected time, cost and quality.

Construction delays can be defined in many ways. In construction claims, the term “delay” is used to mean two different but related matters. Delay is often used to mean the time period, during which some parts of the construction project has been extended beyond what is originally planned because of various unanticipated circumstances (By Barry B. Bramble 2011). Delay can also be the incident that affects the performance of a particular activity, with or without affecting project completion, whereas disruption is an interruption in the planned work sequence or the flow of work. It is distinguished from delay in that the duration of work activities or the overall completion may not be extended. Disruption is a specific loss of productivity caused by changes in the working conditions under which that activity is performed. Lost productivity is a classic result of disruption, because in the end more labor and equipment, not to mention hours are needed to do the same work.

Delay and disruption are different types of damages (By Barry B. Bramble 2011). Delay is defined as a situation when the contractor and the project owner jointly contribute to the non-completion of the project within the original or the stipulated or agreed contract period. Usually, a delay of an activity on the critical path delays the completion of the project. Mathematically, the construction delay is the difference of time between the actual completion date and the contract-based completion date (Acharya et al. 2006). Construction delay is related to progress, compared to the baseline construction schedule delay which happens when there is time overrun or there is an extension of time to complete the project. Therefore, a delay is a situation when the actual progress of a construction project is slower than the planned schedule or late completion of the projects (Abdullah et al. 2010). Delay is then defined as “the time overrun either beyond completion date specified in a contract, or beyond the date that the parties agreed upon for delivery of a project.” Elsewhere, delay is also defined as an “act or event which extends required time to perform or complete work of the contract manifests itself as additional days of work” (El-razek et al. 2009).

Construction delay is generally acknowledged as the most common, costly, complex and risky issue encountered in construction projects. Because of the overriding importance of time for both the owner and the contractor, it is the source of frequent disputes and claims leading to lawsuits. Delay can be caused by a number of unexpected events during the construction which increase the time required for completing the work or increasing the work which must be completed within a specified period of time. In this order, construction delays can be classified according to their origin and timing (Acharya et al. 2006).

Performance of construction player are related with their productivity because its identical with production. The production can be increased by any of the input factor (labour, financial, materials, energy and equipment) and the consequent process in the construction which is internal environment and exogenous factor. Derwin has purpose the Derwin's Open Conversion System, the diagram that show the conversion process associated with complex construction process with influence by technology and many external entity such as weather, government regulation, etc., and various internal environment component (Sweis et al. 2008). This research will use the Derwin's Open Conversion System view to investigate the causes of construction delay. Derwin's Open Conversion System an in Figure 1.

4. Previous studies

Many researches about construction delay have been done nationwide. No specific study on the construction delay in the higher learning institutions has been conducted yet, but studies on the general construction have been reported. In Saudi Arabia , a research that (Assaf and Al-Hejji 2006) reviews the causes of delay states that the average construction project in the country is experiencing delays of 10 to 30 percent of the actual planning. The method of the research is by conducting an analysis using the frequency, relative important index. The result has shown that the most important factor in the delay of the construction project as agreed by all parties is the conversion of the variation orders.

The study of (El-razek et al. 2009) M. E. Abd El-Razek, H. A. Bassioni, A. M. Mobarak aims at identifying the main causes of delay in construction projects in Egypt from the points of view of the contractors, consultants, and owners. The resulting list of delay causes is subjected to a questionnaire survey for the quantitative confirmation and identification of the most important causes of delay. The overall results indicate that the most important causes are: financing by contractor during construction, delays in contractor's payment by owner, design changes by owner or his agent during construction, partial payments during construction, and the non-utilization of professional construction/contractual management. The contractor and owner are found to have opposing views, and they tend to blame one another for delays, while the consultant is seen as having a more intermediate view. The results of the analyses suggest that in order to reduce delay significantly, a joint effort based on teamwork is required. Furthermore, causes of project delay are discussed based on the type and size of the project.

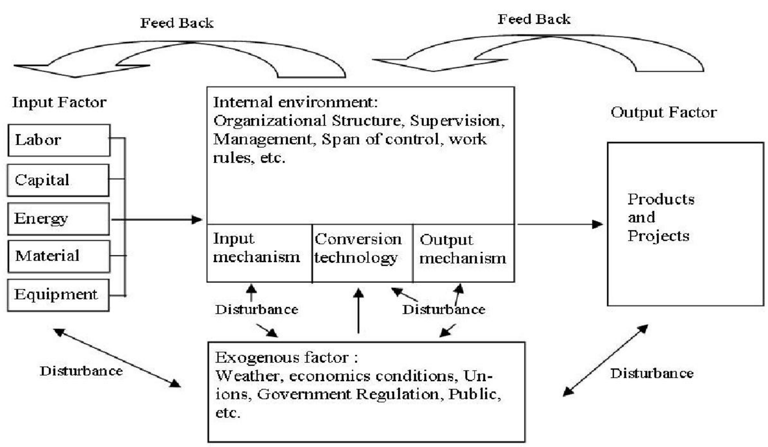

Figure 1: Derwin's Open Conversion System

The work of Ibbs, Asce, Nguyen, & Simonian (2011) focuses on the subject of concurrent delay from a general contractor and subcontractor's perspective. Using a warehouse project as a case study, it then examines different practices that the GC could adopt in apportioning damages of concurrent delays to both himself / herself as well as to the responsible subcontractors. Results are very inconsistent between and within the apportionment practices. This supports an alternative hypothesis that apportionment is an important issue. Practitioners should specify which apportionment practice will be used and under what circumstances will it be applied in their subcontracts. Researchers may develop a more consistent and reliable approach for this type of apportionment.

The study of Aibinu & Odeyinka, (2006) assesses the causes of delays by focusing on actions and inactions of project participants and external factors. The study analyzes quantitative data from completed building projects to assess the extent of delays, and data were obtained from a postal questionnaire survey of construction managers to assess the extent to which 44 identified factors contribute to the overall delays on a typical project with which they have been involved. The findings show that the factors could be prioritized. However, the Pareto analysis reveals that 88% of the factors _representing 39 highest priority factors_ are responsible for 90% of the overall delays. This suggests that there is no discernable difference among the different delay factors and none really stands out as contributing to a large percentage of the problem. A one-sample t test further confirms that most of the factors are important contributors to delays. The results suggest the interdependent nature of construction activities and roles of project participants. The overall ranking of the factors and ranking within each factor category provide useful information for construction industry practitioners, policy makers, and researchers when devising ways of combating delays. The results also indicate areas of the construction industry practice that require improvement.

In the study of Ali, Smith, Pitt, & Choon, (2002) , three objectives of the research have been formulated, namely to identify factors that contribute to delay in construction projects, and to analyse and rank the causes of delay rated by contractors, and to study the effects of delay in construction projects. One hundred questionnaires were distributed during the data collection stage and only 36 responses were received. The respondents only comprise of contractors and sub-contractors because the scope of the research is focused on the contractors' perception. The data collected were analysed using SPSS software. Seven factors that contribute to delay were identified through the literature review, namely contractors' financial difficulties, construction mistakes and defective work, labour shortage, coordination problems, shortage of tools and equipment, material shortage and poor site management. Of those factors, the three most important factors are found to be labour shortage, contractor's financial difficulties and construction mistakes and defective works. Besides project delay, the research shows that cost overrun and extension of time (EOT) are the most common effects of delay in construction projects.

The study of Al-Khalil & Al-Ghafly (1999) presents a survey to investigate three components of delay in the construction of water and sewage works in Saudi Arabia. The components are the frequency of delayed projects, the extent of delay and the responsibility for delay. The research is intended to shed some light on the issue of construction delay in order to avoid, or better manage, delay situations. The results of the survey show that a high proportion of projects are subject to delay. The frequency of delayed projects seems to be associated with the contractor's classification grade but not with the region where the project is constructed. It is also found that the extent of delay is severe and that it is associated with the original project duration. Project owners and consultants tend to assign the major responsibility for delay to the contractors, while contractors believe that the owner is mostly responsible.

5. Methodology

This research paper is descriptive in nature. The researcher used two types of data, primary and secondary data to conduct the goals of this research paper. The primary data conducted from the questionnaire analysis were distributed among the selected samples, and the secondary data for this study which is the literature review were extracted from the journals, the Internet and books and others research papers. The sample is a targeted sample. From the 100 respondents, the majority of the respondents are developers. This is because the developer's perspective towards higher learning institution construction projects also needs to be investigated . The research had gone through many procedures where the researcher looks for literature review to find the causes of delay in the construction stage, then he worked on the questionnaire development, and after which he started to distribute the questionnaire, then analyzed the questionnaire result according to the Rasch model, he did some interviews with some samples to gain more results, and finally to enable the discussion to be carried out for the research paper.

5.1 Questionnaire design

This study questionnaire was compiled from previous researches based on a pilot survey contained in a conference paper entitled Identification of the causes of construction delay in Malaysia. This research questionnaire consists of 2 parts, the first part is demographics and the second part concerns with the delay factors. The expected responses in this questionnaire are according to the 5 Likert scale which are strongly agree, agree, neutral, disagree, strongly disagree. It took 4 months to administer the questionnaire.

The questionnaire divided the causes of delay into 3 types of factors; input, internal and exogenous factor based on Derwin's Open Conversion System. Input factor are the factor causes from the labour, materials, equipment and financial. Next is internal factor is factor that contribute from the construction key player; contractor, developer and consultant and finally exogenous factor are the factor that can be controlled by the project player such as weather and authorities. Table 1 show the causes and types of delay factor with the code of the factor to simplify the causes of delay name to be use in the result interpretation.

Table 1 Delay causes

Causes of delay	Type of factor	Code
Low labour productivity	Input factor	L3
Delays in delivering materials on site	Input factor	M2
Escalation of material price	Input factor	M3
Equipment failure	Input factor	E1
Financial difficulties faced by contractor	Input factor	F1
Financial difficulties by owner	Input factor	F2
Mismanagement by the contractor	Internal factor	CO2
Ineffective planning & scheduling by contractor	Internal factor	CO3
Poor monitoring by the contractor	Internal factor	CO4
Construction mistakes and defective works	Internal factor	CO5
Unrealistic project time given by project owner	Internal factor	DE1
Too many variation orders by owner	Internal factor	DE2
Delay in making decisions by project owner	Internal factor	DE3
Changes in design/design error	Internal factor	CT1
Slow in giving approval of shop drawing	Internal factor	CT2
Incomplete document	Internal factor	CT3
Delay in inspection	Internal factor	CT5
Lack of consultants experience	Internal factor	CT6
Lack of effective communication	Internal factor	AL1
Bad weather condition	Exogenous factor	O1
Delay in building and construction permit approval	Exogenous factor	G2

5.2 Analysis Approach

The Rasch model was named after a Danish mathematician, Georg Rasch.33 The model specifies what should be an expected pattern of responses to items if measurement (at the interval level) is to be achieved. For the Rasch model, dichotomous and polytomous versions are available (Lamoureux et al. 2006). The response patterns achieved are tested against what is expected; a probabilistic form of the Guttman scaling and a variety of statistics used to assess the fit to the model. The Rasch model assumes that the probability of a given respondent affirms that an item is a logistic function of the relative distance between the item's location and the respondent's location on a linear scale. If a person's ability in performing a particular activity is lower than the required ability for that particular task, then the probability of the person's rating the task falls in the highest scoring category

Conversely, if a person's level of ability is greater than the ability required for a particular task, the probability of the person's rating the task in the low scoring category (e.g., not at all) is high. Hence, it is expected that the probability of using any particular rating category will increase monotonically with the difference between the person's level of difficulty in performing daily activities and the level of difficulty required for the particular task. [24] For the ease of the interpretation of scores the IVI rating scale scoring was reversed for the Rasch analysis (0 as 5, 1 as 4, 2 as 3, 3 as 2, 4 as 1, and 5 as 0). A positive item, measured in logits (the unit of measure used by Rasch for calibrating items and measuring persons) on the Rasch scale indicates that the item requires a higher level of participation than the mean of the items, whereas a negative item logit suggests that the item requires a lower level of participation than the average. A positive person-logit score suggests that the person's level of participation is higher than the mean required level of difficulty for the items.

Rasch moves the concept of reliability from establishing the "best fit line" of the data into producing a reliable repeatable measurement instrument. It focuses on constructing the measurement instrument rather than fitting the data to suit the measurement model. By focusing on the reproducibility of the latent trait instead of forcing the expected generation of the same raw score, i.e. the common expectation on repeatability of results being a reliable test, the concept of reliability takes its rightful place in supporting validity rather than being in contentions. Hence; measuring competency in an appropriate way is vital to ensure that valid quality information can be generated for meaningful use; by absorbing the error and representing a more accurate prediction based on a probabilistic model. (Ghulman and Mohd Saidfudin Mas'odi 2009) In the Rasch philosophy, the data have to comply with the principles, or in other words the data have to fit the model. In Rasch's point of view, there is no need to describe the data. What is required is to test whether or not the data allow for measurement on a linear interval scale specifically in a cumulative response process i.e. a positive response to an item stochastically implies a positive response to all items being easy or otherwise. The Rasch Measurement Model is expressed as the ratio of an event being successful.

6. Result And Analysis

The survey was run on construction key players who are involved in the construction of IHL education. The majority of the respondent are developer because of to evaluate the developer perspective towards their construction project. The result was run in Winsteps v 3.6.8, a Rasch analysis software; to obtain the logit values. The Statistics Summary shows the Person-Item Distribution Map (PIDM) where the persons; i.e. the respondent is on the left whilst the items; the causes of delay were plotted on the right side of the logit ruler. The results of the interpretation are different from classical statistics, as the rasch model result shows in the logical ruler in Figure 2.

Before delving any further, it is best to look at the analysis Summary Statistics. The prime information we are looking for in this table is the reliability of this assessment. The value of Cronbach-α =0.82 is in good range which is above the acceptable level 0.6. In addition, Rasch analyses offer a better evaluation where it shows the two components of the test; the Person and the instrument, i.e. item reliability. Rasch found that the Person Reliability was fair at 0.79 and there is a goog and Item Reliability of 0.96 (Fisher 2007). This concludes that we can proceed with the analysis as the instrument has a very high reliability in measuring what is supposed to be measured. This is where Rasch has the major strength as the better model in doing measurement (Saidfudin et al. 2010).

The PIDM Map as in Figure 2 is the heart of Rasch analysis. On the right hand side of the dashed line, the items are aligned from least causes influence to delay (easy) to most causes influence to delay (difficult), starting from the bottom. The distribution of respondent positions is on the left side of the vertical dashed line in increasing order of ability; the best naturally being at the top and the poorest respondent is at the bottom of the rung. In Rasch Model, since we are interested in the person and item's ability in the construction process, it is most prudent to set the scale to zero where the item mean is zero when the ability is deemed 50:50 being the tipping point (Bond and Fox 2007). Rasch analysis tabulates the item's location in a very clear graphical presentation which is easy to read and easier to understand. Each item can be coded with attributes of types of delay that are assessed which affect the construction process. This will enable an in-depth analysis of their study pattern to be evaluated meaningfully.

The analysis shows the result as on Figure 2. On the left side, the person shows the responses of the respondent can be separated by two groups (based on the separation value on the person summary statistics); there is the group that contributes to the construction delay and the group that does not contribute to construction delay. The upper part of the line separated is the person who contributes to delay and the lower part is vice versa. This is proven by the fact that more than 70 percent of the projects are experiencing delay in their schedule. In addition the person performance ability can be computed using person mean (0.57) as below;

$$P(\theta) = \beta v - \delta i = 0.57 - 0 = 0.57$$

$$P(\theta) = \frac{e^{\beta v - \delta i}}{1+e^{\beta v - \delta i}} = \frac{e^{0.57}}{1+e^{0.57}} = 0.36$$

Therefore, the person or respondent performance in the construction is 0.36. P(θ) is generally used to find the probability where a task is achieved by respondents. The respondents had fared poorly below the expected performance by achieving poor mean of only 36%. It indicates the performance value for the respondent to assess or evaluate their performance in the construction processes. They are not even able to perform at least half of their ability in the construction process and contribute to the schedule delay.

The right side of Figure 2 is the causes of the construction delay by rank. The lowest of the rank is the critical factor of delay and vice versa, the line separated the factor contributes to delay in this construction project. It has shown that the most critical factor which is located at the upper part of the line are CO2 and CO3 and this is followed by F1, CO4, CT6, CT1 DE2 DE3 and M2. Besides the causes of delay is has been separated too based on the type of factor. It shows that the most internal factor falls below the line which is the most contributively to the construction delay.

To conduct a rating scale analysis, respondent reaction toward the rating scale should be measured to know the best manner in which the test constructor is intended (Kim and Hong 2004). In CTT the rating scale has never been evaluated; this is important because it was always uncertain how a rating scale was used by individuals in the sample (Linacre 2002). It can be done by Rasch analysis by evaluating the category usage to the average measure and threshold of each category. The structure calibration, s is assessed to confirm the rating classification used. The difference between each structure category shall be in the range $1.4<s<5$. Figure 3 shows the summary of the structure category and the box indicate the s, has noted that the difference between each category is irregular where the difference between category 3,4 and 5 is less than 1.4. Therefore the rating classification is not reflecting this test or the constructor intended.

SUMMARY OF CATEGORY STRUCTURE. Model="R"

CATEGORY LABEL	SCORE	OBSERVED COUNT	%	OBSVD AVRGE	SAMPLE EXPECT	INFIT MNSQ	OUTFIT MNSQ	STRUCTURE CALIBRATN	CATEGORY MEASURE	
1	1	94	4	-.41	-.49	1.15	1.19	NONE	(-2.91)	1
2	2	370	18	-.01	-.08	1.11	1.09	-1.66	-1.15	2
3	3	541	26	.28	.35	.87	.83	-.25	.02	3
4	4	687	33	.74	.80	1.07	1.04	.33	1.16	4
5	5	408	19	1.42	1.31	.91	.93	1.57	(2.85)	5

Figure 3 Summary of structure category

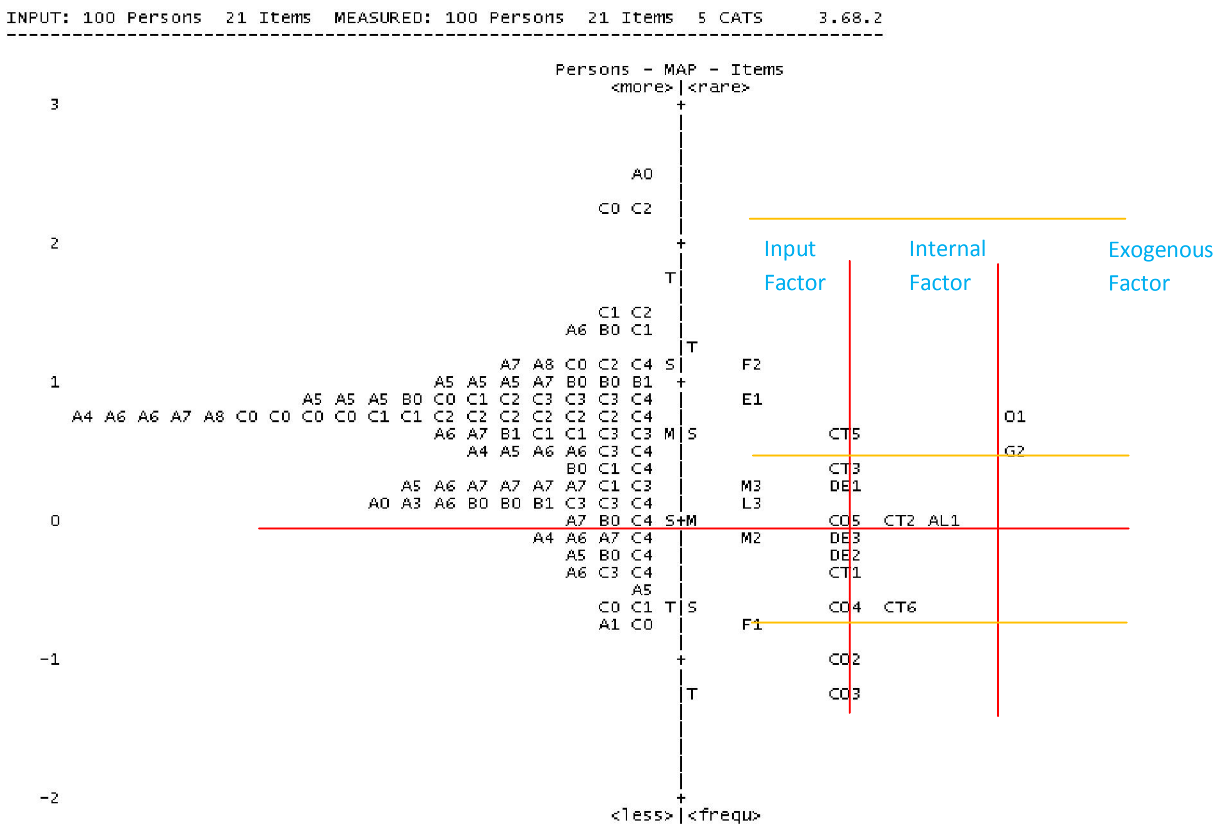

Figure 2 Person-Item Distribution Map (PIDM)

7. Discussion

From the questionnaire, there are eleven causes of construction delay emphasized by the respondents. They consist of ineffective planning & scheduling by contractor, mismanagement by the contractor, financial difficulties faced by contractor, poor monitoring by the contractor, lack of consultants experience, changes in design and design error, too many variation orders by owner, delay in making decisions by project owner, delays in delivering materials on site, construction mistakes and defective works, slow in giving approval of shop drawing. However, only five top causes are being stressed in the discussion.

The top reasons of delay in this sector are ineffective planning and scheduling by contractor, occurring because of unsystematic management and lack of contractor experience. The planning and scheduling can be easier and be more effective with the application of construction project scheduling software such as Microsoft project and Primavera. Thus, the (management team) project players will not be having difficulties in updating the work progress to monitor the work on site as they plan. By using the scheduling software, the work progress can be seen easily and understandably by any project players. If there is any complication or problem that occurs in the construction project regarding the work progress, then it can be directly referred to the scheduling software used.

The second reason is mismanagement by the contractor. This happens due to the lack of contractor experience and knowledge in managing construction projects as well as the team members. An effective and efficient management of site is to assure a project to be completed within the specified period to avoid failure or delay in the construction project. Besides, if the contractor of the construction project did not plan the construction activities well, they would not be ready for any contingencies. Therefore, they must avoid this problem by planning well, and properly, otherwise unexpected obstacles will emerge based on their bad planning which will affect the construction process badly and will slow it down until the contractor solve the planning problems. The contractor needs to prepare a good plan and implement it appropriately. Otherwise any construction problem could occur unexpectedly and will affect the construction process then cause the construction delay. On top of that, the project manager plays an important role in driving and managing the team members to ensure the construction projects are completed within the specified time in collaboration with all parties related to a construction project.

Third cause is financial difficulties faced by contractor where it means that funds are insufficient to carry out construction work. Various factors can contribute to the financial problems faced by the contractors; delayed work payment by the project owner, low profit margins due to adverse economic conditions and capital shortage due to excessive debt incurred by the contractor. All those factors will affect the smooth running of the project; such as labours salary, materials payments and etc. Contractors who are assigned for the project must be financially fit to make sure that the construction projects are smooth

Poor monitoring by the contractor at construction site is the fourth factor of delay. The contractor is not capable to monitor work progress and see that the actual problems on site will lead to losses. Most of the construction projects need subcontractors to carry out works in the construction project and should be monitored by the contractor. A capable subcontractor should be able to carry out the project as planned and complete it on time. Meanwhile the project manager needs to play a good role to prevent any problems caused by the subcontractors. Ineffective monitoring towards the subcontractor also contributes to rework for not meeting the standards set in the contract and finally it would delay the construction work. Therefore the contractor must frequently monitor the construction process and progress to make the schedule on time.

The final cause is the lack of consultant experience. Due to the construction costs determined by the featured drawing given by the consultant, the appointment of competent consultants who have good level of performance should be emphasized. The consultants are responsible to assist the project management course, produce a practical design and get involved in a construction project. Therefore, the project developer should evaluate the appointed consultant by measuring the ability to carry out their role in a construction project. They must have good experience in their work in order to achieve good results and finish the job in time.

8. Conclusion

This research found that there a lot of causes of delay that contribute to slowing down construction sector in high education facilities in Malaysia. According to this research these factors were as follows: financial difficulties faced by contractor, and poor monitoring by the contractor, lack of consultants experience, changes in design, too many variation orders by owner, delay in making decisions by project owner, delays in delivering materials on site. The majority of delay factor are internal factors groups responsibility of the contractor and the management, so the management of the construction supposed to put plans for delay elements and beside that they should prepare for such delays like simulating some of the delay scenarios before starting building the construction project. The rasch model analysis has found that most of the respondents are not capable to run the construction projects. The rasch model has designed for more sensitive, powerful and meaningful analysis so it can rely on the human factor as it can detect the cause of construction delay and its human factor.

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