



Capstone Project Report

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Introduction

The website misoenergy.org states that MISO is “an essential link in the safe, cost-effective delivery of electric power across all or parts of 15 U.S. states and the Canadian province of Manitoba. As a Regional Transmission Organization, MISO assures consumers of unbiased regional grid management and open access to the transmission facilities under MISO’s functional supervision.” MISO offers a number of applications to a variety of users. Access to these applications are dependent on roles of the users. These applications are offered through one platform, called the Market Portal. Market Portal was developed in the 1990’s and continues to use the same technology and interfaces today. MISO proposed that we design and create a new platform for their users one that implements a modern user interface (UI) and offers improved functionality and organization for users.

Problem Space

Based on observational studies and surveys, we discovered that most users would like to see improvements to the Market Portal in organization of functions, website navigation, browser and JAVA compatibility, search function, and the look and feel of the website while keeping it simple. Users want a simplified process for finding a function or data, instead of having to navigate through a long series of menus that are very sensitive to cursor movement. Another user requirement is a help feature that can provide guidance to the users when they cannot find a function or they do not understand certain terms on the site.

Business needs/requirements

Why is this project being proposed?

Miso is “an essential link in the safe, cost-effective delivery of electric power across all or parts of 15 U.S. states and the Canadian province of Manitoba. As a Regional Transmission

Organization, MISO assures consumers of unbiased regional grid management and open access to the transmission facilities under MISO's functional supervision."(Misoenergy.org) Miso offers a number of applications to a variety of users. Access to these applications are dependant on roles of the users. These applications are offered through one platform, called the Market Portal. Market Portal was developed in the 90's and still today uses the same technology and interfaces it was established with. That said, MISO proposes that we design and create a new platform for their users. One that implements modern UI, and offers better functionality and organization for it's users.

From the data, we identified five primary user needs and requirements. The list below describes these needs/requirements along with a general statement of our proposed approach to address these items.

- Users need easier navigation throughout the website. To satisfy this need, we would simplify the navigation process to make it more intuitive.
- Users need a better organization of applications. For this need, we would enable the users to customize the Market Portal website based on user preferences.
- Users want a modern design. To address this preference, we would produce designs that are familiar, concise, and in line with current industry standards.
- Users need a search function. We would design a search tab for looking up a function a user does not know where to find.
- Users need a help function. For this need, we would (a) create a help feature that contains guidelines on performing certain actions and (b) include more instruction on each application page in the website.

Literature Review

Modern UI and Intuitive Navigation

One of the goals mentioned above is to implement intuitive navigation. What does this mean and are all web based navigations the same? The answer is NO. In a recent article from Learn Life, an education company, intuitive navigation consists of 3 main factors, those being simplicity, consistency, and efficiency (“The Importance of Intuitive,” 2015). Including all three components creates a seamless experience for users. Having an intuitive navigation will coincide with another goal for MISO and that’s updating the look and feel. We see a trend today with some of the most innovative and competitive companies out there like Google, Twitter and Pinterest, just to name a few. These companies are implementing a tile and cards user interface, referred to as “Modern UI”. The way we share information is always changing and little is more. To use cards effective you have to understand your consumer and what is important to them. Cards are used to share information just enough to grab the attention of consumers which can direct them to select the card to gain additional information of of desired interests. “Cards are a great medium for communicating quick stories”(“Designing Card-Based User Interfaces”, 2016). The article goes on to discuss how easy cards can be manipulated with actions from users interacting with cards while in a site. With all the information/applications within the market portal, we believe this is just way to revamp the site and give it a new life when customers use it. Cards will be able to display quick information that explains what they would be clicking on and it would also allow us to embed tabs within the card to get them to their place of interest. The card feature also also gives us the ability to make to make each consumer's home page personal

by allowing MISO consumers to favorite their cards. This would bring selected cards to the top for quick navigation to task destinations.

Web Site Best Practices

There are many components to designing websites. One study conducted by Newman & Landay, included in their paper *Sitemaps, storyboards, and specifications: a sketch of Web site design practice*, presents the idea of combining smaller

elements to create bigger elements or making the big picture easy to vision. As shown in this venn diagram (figure 1) there are 3 components or smaller elements

used to create a good website, Information Design, Navigation Design, and Graphic Design. On top of that there is User interface design and information

architecture which overlays the elements. Lastly, Usability Evaluations, only overlaps, Navigation Design

and Information design, this tells us that we will focus less on the graphic design of the site until we can flush out the Usability. All these components interconnect and need other factors to function and create a good website, we need to focus on all these components and implement this to the MISO website.

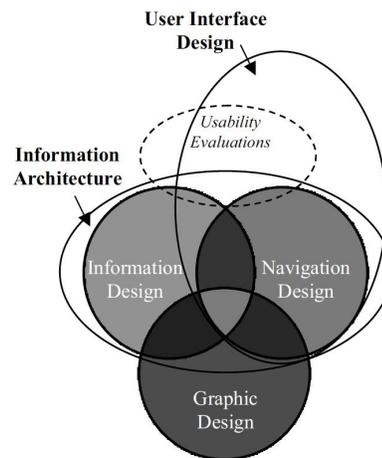


Figure 1

Sitemaps, storyboards, and specifications: a sketch of Web site design practice (Newman & Landay, 2000).

Conceptual Design

During our initial design stages, we relied on sketches to allow us to produce multiple variations of ideas to improve the Market Portal user experience. While we came up for multiple designs we all came to agreement on the use of tiles, seen in Figure 2, would help us reach our

goal.

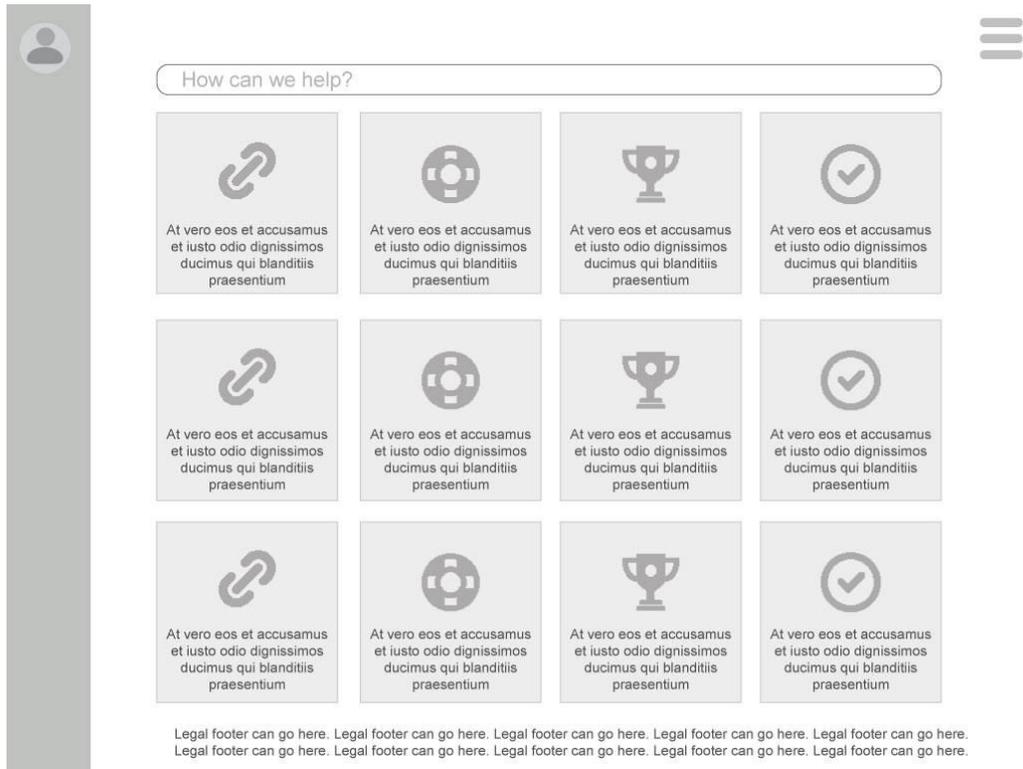


Figure 2

Low-Fidelity Prototype

Based on the conceptual design, we created a low-fidelity prototype Figure 3. During this stage of the project, we added new features based on the feedback we received through the questionnaire sent to market participants. One of these features is a data visualization element, based on requests in the questionnaire responses for showing a summary of data, as well as a notification or an alert message, on the home screen.

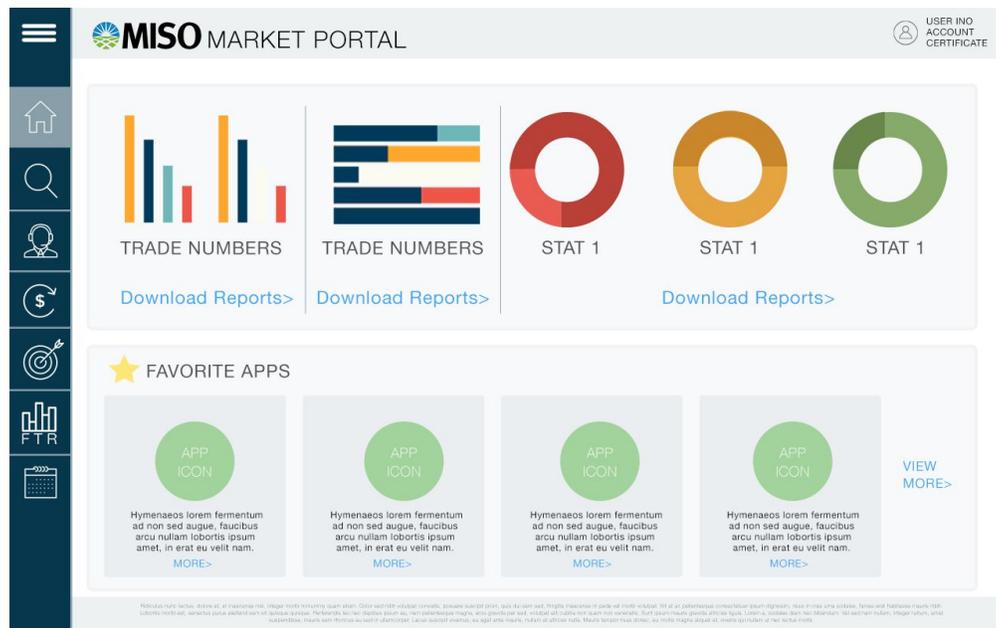


Figure 3

High-Fidelity Prototype

From our data gathered in user testing, we developed the home screen shown in Figure 4, with the following refinements.

- Corrected color and image designs to match public site
- Added “Search” navigation bar and moved it to the center
- Added description for each icon in navigation bar

First, we referred to MISO internal design guidelines to match colors with the public website, as our client wanted the public website and the Market Portal look similar. As blue and green are their company color, our design focused on using those two colors. Second, we added a search bar to the home screen. By having the search bar in the home screen as well, it can provide additional help to the users that do not know which applications are located under each category. Such users can simply type in the name of application in the home screen, without having to

click on each category until they find the application they want to open. Third, we labeled each icon in the navigation bar as the meaning of each icon may not be clear to every user.

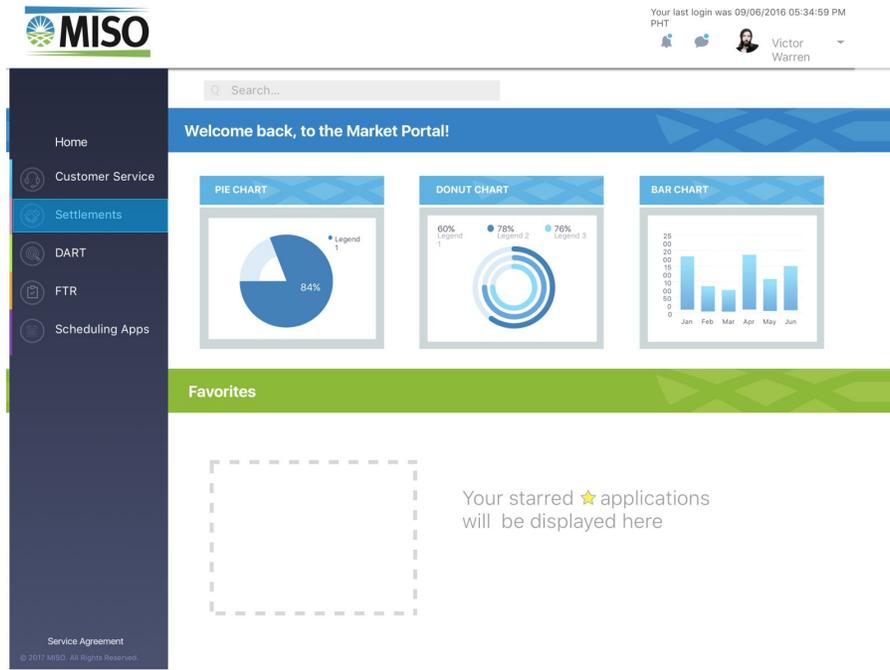


Figure 4

One of highest priorities for the new design was to improve the search options. Figure 5A displays the option for a user to scroll vertically on the page. The new addition of color matching and icon personalization of each tile will make it easier for users to read text and as well as recognize icons quickly. Additionally, we reduced the number of tiles in each row from four to three. This refinement prevents the layout from looking congested. Moreover, each tile has same color as the category it belongs to. For example, every application in Customer Service category is highlighted with light blue color. It is the same color that was used to mark each category in the home screen. This offers a visual cue to the users to recognize if they are in the right category. Figure 5B displays the option for a user to use the “Search” option at the top of

the page. This will help users narrow down to a specific tile or application if there are too many tiles on the page.

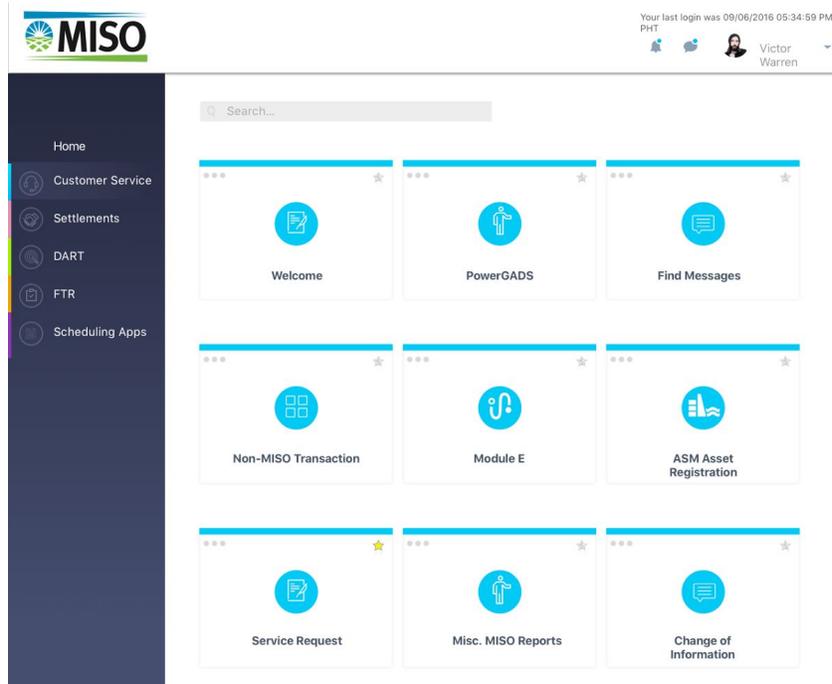


Figure 5A

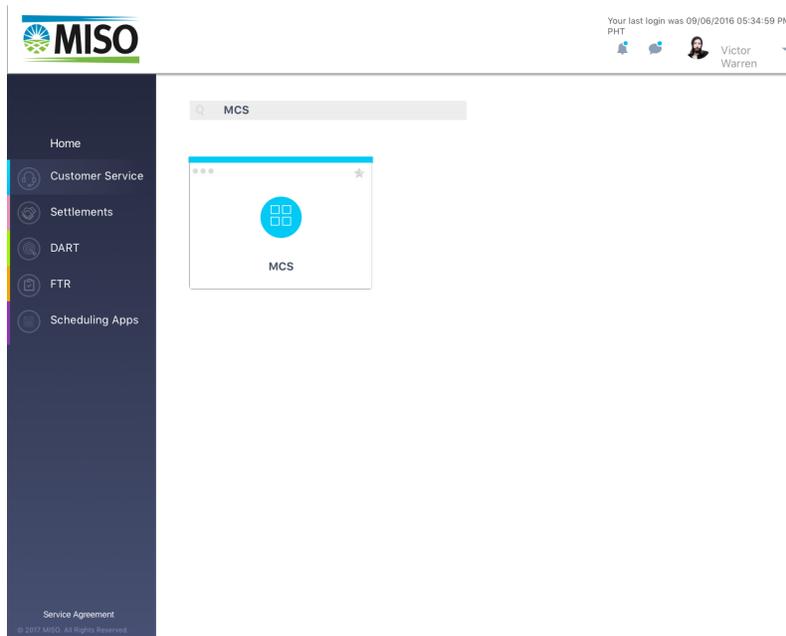


Figure 5B

Figure 6 displays the ability to personalize a user's experience for the Market Portal. The ability of being able to add and remove tiles gives the user the ultimate experience for personalizing the home screen. Through personalization, a user does not have to navigate through number of applications to find a single application every time he/she logs in to the Market Portal. According to survey, many participants asked for improvement in the time-consuming and frustrating process for finding and opening the application they want to interact with. Because there was not a favorites feature, the users had to click on each tab to navigate through the menu and locate the application. But in our design, this personalized favorites feature greatly simplifies the process and saves time. Along with being able to add and remove favorites, the top three tiles will provide valuable information dealing with the user's role in the Market Portal. The possibilities of the information displayed could include trading numbers, upcoming buy/sell expectations, or other MISO information that the user would need to know.

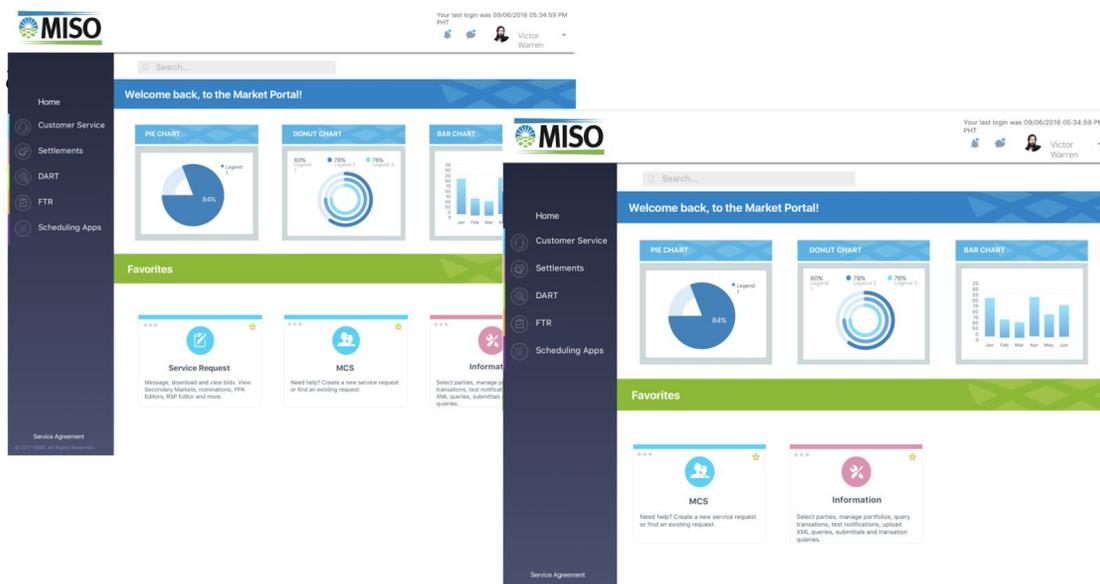


Figure 6

User Testing

We conducted user testing of a high-fidelity prototype with eight participants: four MISO employees, one IUPUI student, and three others with varying background experiences. The MISO employees varied in their job positions but they all have used Market Portal, whereas the other participants had no previous exposure to the Market Portal.

Procedure

A moderator started each session by greeting the participant(s) and introducing the prototype. During the introduction, users were asked to look around the home screen and think aloud what he/she were seeing. The participants were asked to perform several tasks, while the participants thought aloud recorders located in the room would be writing anything the participant did or said pertaining to the prototype. The tasks they were asked to perform include: scrolling through the applications, adding an application to favorites, using a search bar to find an application, opening an app, and closing the app after interacting with it. Participants were asked to think aloud while performing the tasks. After the participant completed all tasks, each participant was given a questionnaire to complete and return to the project team. The testing script and follow-up questionnaire are included in Appendix A.

MISO Employees

Testing with MISO employees was conducted in a quiet conference room at MISO with the Market Portal prototype presented on a laptop computer. Two of the testing sessions involved a single participant and one testing session involved two participants. For each session, a moderator read the testing script and guided the participant(s) through the tasks. Each session lasted about 20 minutes.

IUPUI Student

Testing with the IUPUI student was conducted at the Herron School student lab with the Market Portal prototype presented on a laptop computer.

Other Participants

Testing of the other participants was in a small room and the Market Portal prototype was presented on a laptop computer. One testing session involved two participants and a second testing session involved one participant.

A moderator started each session by greeting the participant(s) and introducing the prototype. The participant's initial reaction to the prototype were recorded and then the participants were asked to perform a 4 tasks, Appendix B, while thinking aloud. The first task was to introduce the user to the customization of the web site by favoriting their first app, then returning to the home to see what happens when clicking on the "star" icon. The second task introduced the ability to use the search bar within the selected tab. Task three was used to see how the user would find an app by either scrolling or using the newly added search function. The last task asked the user, while on the home screen, to unfavorite a app. This question was left open for the test user take either option of selecting the star icon or second option of using the three dot menu to display the options they had with the app.

Results

Participants were generally very favorable to the prototype. The feature they especially liked was the "favorites feature", because they indicated that this feature would save time. They also liked that the prototype was "very simple" to use. Some participants reported that they would like to add as many favorites they wanted, and that a "reordering" feature for favorite applications would be helpful. Participants also liked the interface design and called it "modern."

One participant liked that the menu order and menu name was the same as the current Market Portal website, because this participant was used to seeing and working with those menus. One participant liked the idea of opening an application as a pop-up window instead of redirecting the main browser window to another page.

Suggestions received include:

- For the “favorites feature”:
 - To prevent the unfavoriting an app by accident the use of hover text should be used. (ex: click on a star by mistake)
 - Here are two examples of what the hover text would read:
 - When wanting to add an app to the home screen “adds to home page”
 - When selecting the star on the home screen “removes from home page”
 - Having a single, external button for reordering favorites
 - The “three dots” button’s meaning is unclear
- For Submitting forms:
 - Text in input field looks like sample text. They are too light in color.
 - Varying the size of the Head text to the input text.
 - Color-coding fields in same categories
- Data visualization and notifications
 - (for CS department) it can show users’ comments, current achievements (how many claims resolved so far), and announcements.
- Other expected information/functions
 - Introduction of MISO in the chart area

- Recent information on the navigation bar
- Distinct whether the search bar was for global searching or category searching when on a selected tab

Conclusions

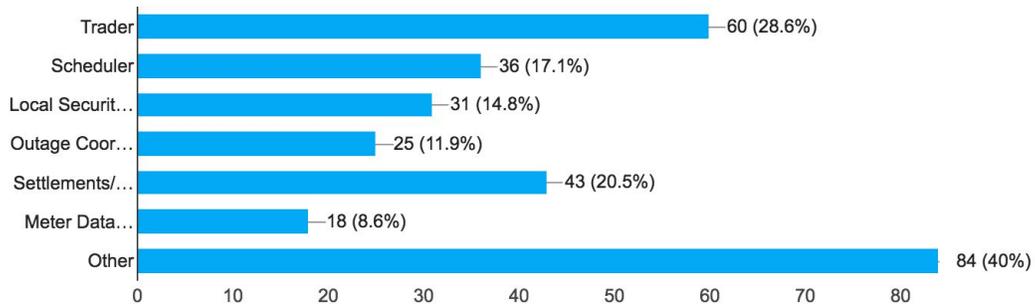
Overall, the positive feedback from the participants reassured us that we were going in the right direction with our design. Based on the feedback, a revised version of the design could implement a feature for reordering favorite applications, because the participants stated that such a feature would be very helpful. The visual design of the favorite application section could also be revised based on participant suggestions regarding the look and location of icons. On forms, the text color could be changed to make the text more clear to the viewers. Other potential revisions, for which it would be helpful to have further discussions with MISO employees, include deciding how to color-code input fields of a form and determining preferences for the appearance of the chart area.

Throughout testing, participants frequently mentioned the word “simple.” The participants very much appreciated the simplicity in using the Market Portal. If features are added to the current prototype, care should be taken not to complicate the Market Portal.

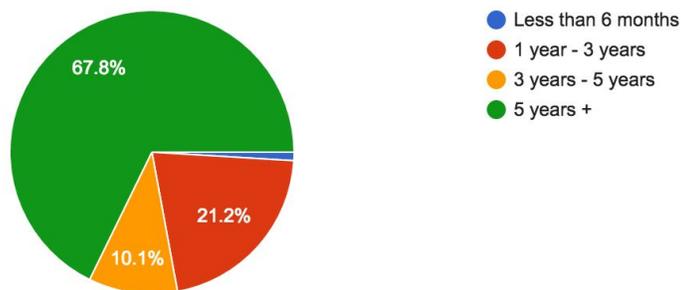
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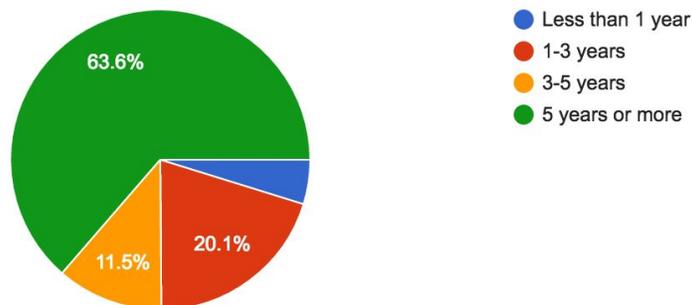
What role do you play within your company? (210 responses)



How long have you worked in the above company? (208 responses)

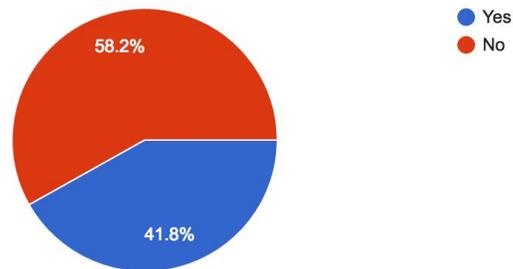


How long have you been a MISO Market Participant? (209 responses)



What is your main purpose when using MISO's Market Portal? (197 responses)

When using MISO's Market Portal do you feel that it would be beneficial to have a search engine? (208 responses)



If Yes, what would you use it to search for? (69 responses)

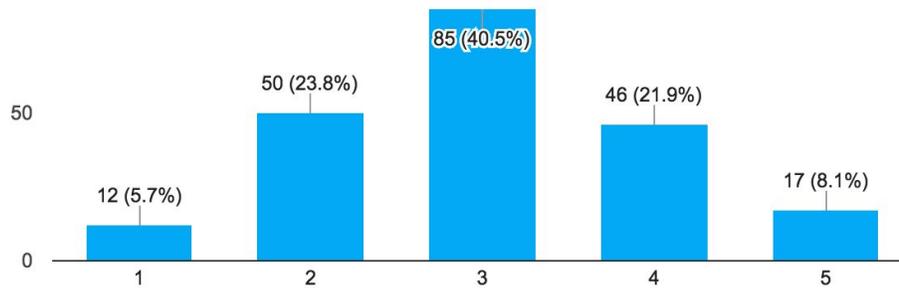
The frequent answers included:

- Tabs
- XML information
- Error message solution
- Offers for specific date
- Data inside reports
- Nodes
- Glossary
- Process guide on how-to

looking for quickly? (210 responses)

Overall Satisfaction

How would you rate your overall satisfaction with MISO's Market Portal? (210 responses)



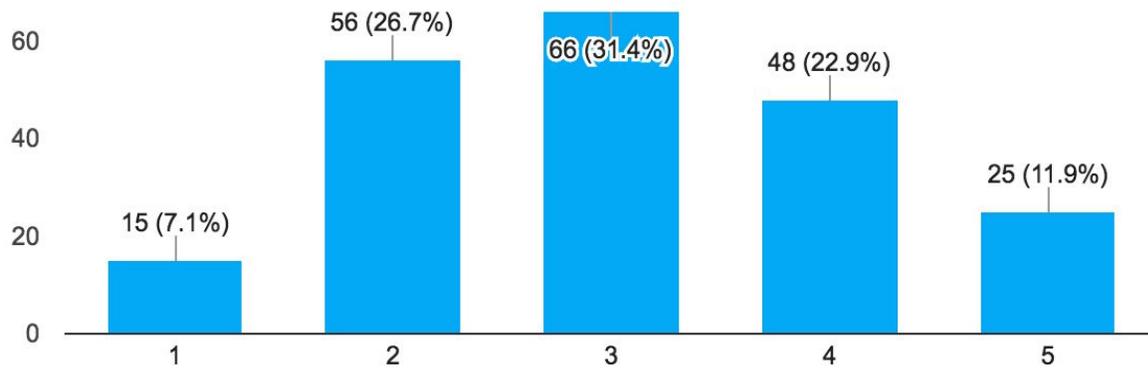
What do you like most about using the Market Portal? (129 responses)

The frequent answers include:

- Ease of use
- Simplicity
- Reliability
- Not constantly changing

But at the same time, there were considerable number of answers that stated “nothing” or expressed dissatisfaction. While some participants presents above points as the strong points of MISO, there were some participants who disagreed MISO MP had such strong points and actually experiencing the opposite.

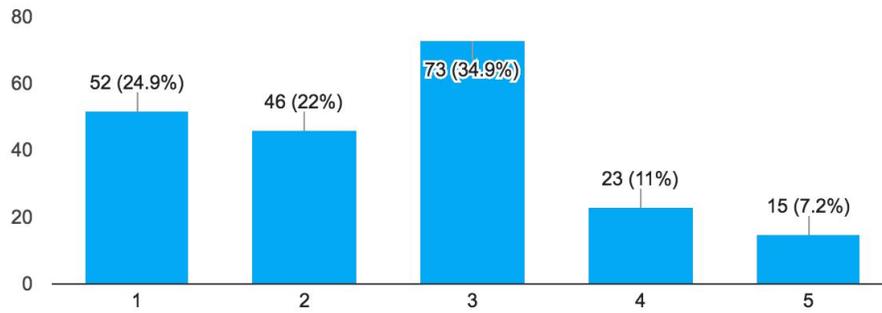
What do you dislike most about Market Portal? (154 respo



nses)

- Dead links
- Mouse-over menus that are sensitive to cursor movements
- Slow speed
- Not user friendly
- Browser compatibility
- Using certificates for access
- Compatibility issue with recent versions JAVA
- Bugs
- Difficult navigation
- Inability copy and paste

Do you think that the Market Portal needs a new look? (209 responses)



What functionality would you like us to add/remove/change? (125 responses)

The suggestions include:

- Link to MISO public website
- Ability to export to Excel
- Improvements in navigation
- More intuitive and effective organization of functions
- Allow copy and paste
- Fix compatibility issues

Appendix B

Testing Script

Please look over the home screen. While doing so, we ask to think out loud while looking around.

1. From home screen navigate “settlements” page.
2. Within this page please scroll to find the “information” app and favorite it.
3. Go back to the home page.

Do you notice anything on this page?

Was it easy to complete this task?

4. Navigate to customer service page
5. use the search bar to find “MCS”. Once found please favorite this app.
6. Go back to the home screen.

Do you notice anything updated?

How did you feel about using the search bar?

7. From home screen navigate again to the “Customer Service” page.
8. Within this page please use the scroll OR the search feature to find the “Service Request” app and favorite it.
9. Click on the app and Create request.

Which method did you use to find “Service Request” and why?

10. Navigate back to the home screen. What do notice different?
11. On the Home screen please delete Service Request app.

Was it easy to edit your favorite apps?

How many favorites would you want?