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### Westinghouse Microwave Executive Report

Customers who use a microwave are looking for a product that can assist them in cooking meals quickly. Through the analysis of the barcode scanning microwave, there were a few assumptions made about the users. First, for all of the analyses, it was assumed that the users already had their item prepared to be microwaved. Second, all times were determined for setting up the microwave to start the cooking process. The time was not accounted for during or after the microwave was cooking the item for the keystroke level models.

Users who were assumed to use this microwave are familiar with the interface, since keystroke level modeling is based on averages of user times from your company's engineers. The operators used in the keystroke level modeling included mental act or routine thinking (M - .28 s), homing a hand or finger onto a button (H - .4 s), distractions (D - 1.2 s), swiping barcode with wand (S - .5 s), pressing a button (B - .2 s), loading microwave (L - 2 s), and time lost to error (E - 4 s). In this analysis, distractions and errors were not used in the models (see Tables), but will be discussed.

The first use of microwaves is where parents cook quick meals for children after work. In the original model of microwave it would take 22 seconds to type in all the codes (without distractions) to heat the food. Using the keystroke level model to analyze the new system (assuming that the item is in the microwave database), it would only take 5.06 seconds (see Table 1). Using the new system would have a 16.94 second savings in this instance. Neither of these conditions, however, considered error or distractions for the user.

The second use of the microwave analyzed in the use of making popcorn. The assumption of the user is that they will just cook the popcorn for 5 minutes and listen for when

the popcorn stops popping. In theory, this should be the same for each model of microwave with quick press timing buttons. If they were to use the method on the old model of typing in codes, it would then again take 22 seconds (without distractions). If they used the quick press buttons on the new model of microwave, the process to start cooking should only take 2.6 seconds (see Table 2).

The final use of the microwave that was analyzed was heating frozen vegetables in the microwave. Once again, using the old system it would take approximately 22 seconds to enter the codes to cook the vegetables. For the new system, if the item is recognized in the database, it will take the same amount of time as the first use case, taking a total of 5.06 seconds (see Table 1), resulting in a saving of 16.94 seconds. However, if the frozen vegetables are not recognized in the database (60% of the time) the procedure that must be followed will be in Table 3. This process would take a total of 12.62 seconds with a high power item and 14.42 seconds with a low power cooked item (without errors or distractions). Since there are a number of errors that could occur with this condition (a lot of steps), it could roughly take 16.62 to 18.42 seconds to complete this sequence with an error.

To properly compare the final use case to the previous model, the lower numbers are taken since the original data was in a laboratory with no errors or distractions included in the analysis. In taking the original numbers from the KLM analysis in Table 3, 12.62 to 14.42 seconds the time savings would be 7.58 to 9.38 seconds in using the new model. Once the item is saved in the database, however, it will go back to the same time as the first use case (5.06 seconds) to have a savings of 16.94 seconds compared to the old model of microwave.

Through using keystroke level modeling, my recommendation would be to use the funds to deploy the new microwave model. Even in a situation where errors occur in adding a new item

to the database, the new model has significant time savings compared to the old model. In using the scanning wand, customers will not have to memorize codes and therefore will be more likely to use the wand than the code manual. Also, if there are some customers who currently use the codes and have memorized the common ones used, they will be able to enter those codes into the new microwave. This will allow Westinghouse to reach a broader customer base to include those who want a faster way to microwave and not memorize codes in order to do so. Therefore, through the analysis, the final recommendation would be to use Westinghouse's resources to create and market the new model of microwave.

<b>Table 1. Parents Cook Quick Meals for Children After Work</b>		
<b>Operations</b>	<b>Operator(s)</b>	<b>Time</b>
1. Press Scan	M, H, B	0.88
2. Use Scanning Wand	H, S, H	1.3
3. Check Food Instructions	M	0.28
3. Place Food in Oven	L	2
4. Press Start	H, B	0.6
	<b>Total Time:</b>	<b>5.06</b>

<b>Table 2. Cook Popcorn</b>		
<b>Operations</b>	<b>Operator(s)</b>	<b>Time</b>
1. Put popcorn in Microwave	L	2
2. Press 5	H, B	0.6
	<b>Total Time:</b>	<b>2.6</b>

<b>Table 3. Cook Frozen Vegetables</b>		
<b>Operations</b>	<b>Operator(s)</b>	<b>Time</b>
1. Press Scan	M, H, B	0.88
2. Use Scanning Wand	H, S, H	1.3
3. Press Start	H, B	0.6
4. NOT IN MEMORY	M	0.28
5. Press Learn	H, B	1
6. Scan Barcode	H, S, H	1.3
7. Press Power	H, B	0.6
<i>7.1 If needed, press power continuously</i>	<i>For low power: B, B, B, B, B, B, B, B, B</i>	<i>1.8</i>
8. Enter Cooking Time	H, B, B, B	1
9. Press Learn to Save	H, B	0.6
10. Think about Process	M, M	0.56
11. Press Scan	H, B	0.6
12. Use Scanning Wand	H, S, H	1.3
13. Put Food in Oven	L	2
14. Press Start	H, B	0.6
	<b>Total Time</b>	<b>12.62</b>
	<b>Low Power, Total Time:</b>	<b>14.42</b>