# Appendix A. Instrumentation

**Table A1.** Questionnaire items and sources

# Perceived likelihood

Please indicate your perceptions of the likelihood of an information security incident affecting your organisation:

Scale: 1= Extremely Unlikely, 2 = Unlikely, 3 = Neither Likely nor Unlikely, 4 = Likely, 5 = Extremely Likely

|  |  |  |
| --- | --- | --- |
| No. | Question | Source |
| 1 | It is \_\_\_\_\_\_\_\_ that a security incident will occur at my organisation that will result in a business critical information system being unavailable for a prolonged period. | Adapted from Herath and Rao (2009a). |
| 2 | It is \_\_\_\_\_\_\_\_ that a security incident will occur at my organisation that will result in confidential information being disclosed to an unauthorised party. | Adapted from Herath and Rao (2009a). |
| 3 | It is \_\_\_\_\_\_\_\_ that a security incident will occur at my organisation that will result in the integrity of information stored in a system being compromised. | Adapted from Herath and Rao (2009a). |

# Perceived impact

Please indicate your perceptions of the impact an information security incident would have on your organisation:

Scale: 1 = Extremely Insignificant, 2 = Insignificant, 3 = Neither significant nor insignificant, 4 = Significant, 5 = Extremely Significant

|  |  |  |
| --- | --- | --- |
| No. | Question |  |
| 4 | The impact my organisation would be \_\_\_\_\_\_\_\_ if a business critical information system was unavailable for a prolonged period. | Adapted from Herath and Rao (2009a). |
| 5 | The impact on my organisation would be \_\_\_\_\_\_\_\_ if confidential information was disclosed to an unauthorised party. | Adapted from Herath and Rao (2009a). |
| 6 | The impact on my organisation would be \_\_\_\_\_\_\_\_ if information was corrupted within business critical information system. | Adapted from Herath and Rao (2009a). |

## 

## Response costs

Please indicate to what extent you agree with the following statements:

Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree nor Disagree, 4 = Agree, 5 = Strongly Agree

|  |  |  |
| --- | --- | --- |
| No. | Question |  |
| 7 | The inconvenience of performing information security behaviours exceeds the benefits | Adapted from Workman et al. (2008). |
| 8 | The cost of performing information security behaviours exceeds the benefits | Adapted from Workman et al. (2008). |
| 9 | The impact to my work from performing information security behaviours exceeds the benefits | Adapted from Workman et al. (2008). |

## Response efficacy

Please indicate your perceptions of the effectiveness of the information security behaviours you are expected to perform:

Scale: 1 = Very Ineffective, 2 = Ineffective, 3 = Neither Effective nor Ineffective, 4 = Effective, 5 = Very Effective

|  |  |  |
| --- | --- | --- |
| No. | Question |  |
| 10 | The information security behaviours I am expected to perform are \_\_\_\_\_\_\_\_ at protecting the confidentiality of my organisation’s information. | Adapted from Workman et al. (2008). |
| 11 | The information security behaviours I am expected to perform are \_\_\_\_\_\_\_\_ at protecting the integrity of my organisation’s information. | Adapted from Workman et al. (2008). |
| 12 | The information security behaviours I am expected to perform are \_\_\_\_\_\_\_\_ at protecting the availability of my organisation’s information. | Adapted from Workman et al. (2008). |

Please indicate to what extent you agree with the following statements:

Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree nor Disagree, 4 = Agree, 5 = Strongly Agree

|  |  |  |
| --- | --- | --- |
| No. | Question |  |
| 13 | The information security behaviours I am expected to perform make a difference to the security posture of my organisation. | Adapted from Herath and Rao (2009a). |

## Response benefits

Please indicate to what extent you agree with the following statements:

Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree nor Disagree, 4 = Agree, 5 = Strongly Agree

|  |  |  |
| --- | --- | --- |
| No. | Question |  |
| 14 | I feel content if I comply with my organisation’s information security behaviours. | Adapted from Bulgurcu et al. (2010). |
| 15 | I feel satisfied if I comply with my organisation’s information security behaviours. | Adapted from Bulgurcu et al. (2010). |
| 16 | I feel accomplished if I comply with my organisation’s information security behaviours. | Adapted from Bulgurcu et al. (2010). |
| 17 | I feel fulfilled if I comply with my organisation’s information security behaviours. | Adapted from Bulgurcu et al. (2010). |

Please indicate the likelihood of the following statements:

Scale: 1= Extremely Unlikely, 2 = Unlikely, 3 = Neither Likely nor Unlikely, 4 = Likely, 5 = Extremely Likely

|  |  |  |
| --- | --- | --- |
| No. | Question |  |
| 18 | I will receive a pay rise if I comply with my organisation’s information security behaviours. | Adapted from Bulgurcu et al. (2010). |
| 19 | I will receive a promotion if I comply with my organisation’s information security behaviours. | Adapted from Bulgurcu et al. (2010). |

## 

## Cues to action

Please indicate the frequency with which your organisation performs the following:

Scale: 1 = Never, 2 = Rarely; 3 = Occasionally, 4= Often, 5 = Always.

|  |  |  |
| --- | --- | --- |
| No. | Question |  |
| 20 | My organisation \_\_\_\_\_\_\_\_ distributes security awareness material to all employees using email newsletters and intranet articles. | Adapted from Ng et al. (2009). |
| 21 | My organisation \_\_\_\_\_\_\_\_ organises security talks/presentations for IT employees. | Adapted from Ng et al. (2009). |

Please indicate to what extent you agree with the following statements:

Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree nor Disagree, 4 = Agree, 5 = Strongly Agree

|  |  |  |
| --- | --- | --- |
| No. | Question |  |
| 22 | My organisation constantly reminds me of my responsibility to practice information security behaviours. | Adapted from Ng et al. (2009). |
| 23 | My organisation ensures that information security policies are available to all employees. | Adapted from Herath and Rao (2009a). |
| 24 | My organisation’s information security policies are written in plain English and are easy to understand. | Adapted from Herath and Rao (2009a). |

# Social norms

Please indicate to what extent you agree with the following statements:

Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree nor Disagree, 4 = Agree, 5 = Strongly Agree

|  |  |  |
| --- | --- | --- |
| No. | Question |  |
| 25 | Senior management thinks that I should comply with the organisation’s required information security behaviours | Adapted from Herath and Rao (2009a). |
| 26 | My manager thinks that I should comply with the organisation’s required information security behaviours | Adapted from Herath and Rao (2009a). |
| 27 | My colleagues think that I should comply with the organisation’s required information security behaviours | Adapted from Herath and Rao (2009a). |

## Detection

Please indicate the frequency with which your organisation performs the following actions:

Scale: 1 = Never, 2 = Rarely; 3 = Occasionally, 4= Often, 5 = Always

|  |  |  |
| --- | --- | --- |
| No. | Question |  |
| 28 | My organisation \_\_\_\_\_\_\_\_ monitors IT employee’s actions to detect violations of information security behaviours. | Adapted from Herath and Rao (2009a). |

Please indicate to what extent you agree with the following statement:

Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree nor Disagree, 4 = Agree, 5 = Strongly Agree

|  |  |  |
| --- | --- | --- |
| No. | Question |  |
| 29 | If I violate my organisation’s required information security behaviours I will be caught. | Adapted from Herath and Rao (2009a). |
| 30 | I would feel embarrassed if I was caught violating my organisation’s information security behaviours. | New |

## Sanctions

Please indicate to what extent you agree with the following statements:

Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree nor Disagree, 4 = Agree, 5 = Strongly Agree

|  |  |  |
| --- | --- | --- |
| No. | Question |  |
| 31 | My organisation disciplines IT employees who violate information security behaviours. | Adapted from Herath and Rao (2009a). |
| 32 | My organisation terminates employees who repeatedly violate information security behaviours. | Adapted from Herath and Rao (2009a). |

Please indicate the likelihood of the following sanctions being imposed by your organisation:

Scale: 1= Extremely Unlikely, 2 = Unlikely, 3 = Neither Likely nor Unlikely, 4 = Likely, 5 = Extremely Likely

|  |  |  |
| --- | --- | --- |
| No. | Question |  |
| 33 | I will be punished if I was caught violating my organisation’s information security behaviours. | Adapted from Herath and Rao (2009a). |
| 34 | I will receive written reprimand if I was caught violating my organisation’s information security behaviours | Adapted from Bulgurcu et al. (2010). |
| 35 | I will receive verbal reprimand if I was caught violating my organisation’s information security behaviours | Adapted from Bulgurcu et al. (2010). |
| 36 | I will be demoted if I was caught violating my organisation’s information security behaviours. | Adapted from Bulgurcu et al. (2010). |
| 37 | I will incur non-monetary penalties if I was caught violating my organisation’s information security behaviours. | Adapted from Bulgurcu et al. (2010). |
| 38 | I will incur monetary penalties if I was caught violating my organisation’s information security behaviours. | Adapted from Bulgurcu et al. (2010). |

## 

## Self-efficacy

Considering the information security behaviours that your organisation expects you to perform as part of your job, please indicate to what extent you agree with the following statements:

Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree nor Disagree, 4 = Agree, 5 = Strongly Agree

|  |  |  |
| --- | --- | --- |
| No. | Question |  |
| 39 | It is difficult for me to perform the information security behaviours required by my organisation. | Adapted from Workman et al. (2008). |
| 40 | I have the necessary skills to protect my organisation from information assets from security incidents. | Adapted from Workman et al. (2008). |
| 41 | It is easy for me to perform the information security behaviours required by my organisation. | Adapted from Herath and Rao (2009a). |
| 42 | My organisation provides adequate training for me to perform the information security behaviours expected of me. | New |

# Intention

Please indicate to what extent you agree with the following statements:

Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree nor Disagree, 4 = Agree, 5 = Strongly Agree

|  |  |  |
| --- | --- | --- |
| No. | Question |  |
| 43 | I intend to comply with the information security behaviours required by my organisation. | Adapted from Bulgurcu et al. (2010). |
| 44 | I intend to protect information and technology resources according to the information security behaviours required by my organisation. | Adapted from Bulgurcu et al. (2010). |
| 45 | I intend to carry out my information security responsibilities prescribed by my organisation when I use information and technology. | Adapted from Bulgurcu et al. (2010). |

**Appendix B. Model validation**

**Table B1.** Factor loadings to latent constructs, variance extracted, and composite reliabilities

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Construct | Item | Text | Factor loading | Variance extracted | Composite reliability |
| Perceived likelihood | 1 | It is \_\_\_\_\_\_\_\_ that a security incident will occur at my organisation that will result in a business critical information system being unavailable for a prolonged period. | 0.667 | 0.722 | 0.884 |
|  | 2 | It is \_\_\_\_\_\_\_\_ that a security incident will occur at my organisation that will result in confidential information being disclosed to an unauthorised party. | 0.924 |  |  |
|  | 3 | It is \_\_\_\_\_\_\_\_ that a security incident will occur at my organisation that will result in the integrity of information stored in a system being compromised. | 0.931 |  |  |
| Perceived impact | 4 | The impact my organisation would be \_\_\_\_\_\_\_\_ if a business critical information system was unavailable for a prolonged period. | 0.834 | 0.646 | 0.784 |
|  | 5 | The impact on my organisation would be \_\_\_\_\_\_\_\_ if confidential information was disclosed to an unauthorised party. | Dropped |  |  |
|  | 6 | The impact on my organisation would be \_\_\_\_\_\_\_\_ if information was corrupted within business critical information system. | 0.771 |  |  |
| Response costs | 7 | The inconvenience of performing information security behaviours exceeds the benefits. | 0.872 | 0.744 | 0.896 |
|  | 8 | The cost of performing information security behaviours exceeds the benefits. | 0.736 |  |  |
|  | 9 | The impact to my work from performing information security behaviours exceeds the benefits | 0.964 |  |  |
| Response efficacy | 10 | The information security behaviours I am expected to perform are \_\_\_\_\_\_\_\_ at protecting the confidentiality of my organisation’s information. | Dropped | 0.594 | 0.814 |
|  | 11 | The information security behaviours I am expected to perform are \_\_\_\_\_\_\_\_ at protecting the integrity of my organisation’s information. | 0.828 |  |  |
|  | 12 | The information security behaviours I am expected to perform are \_\_\_\_\_\_\_\_ at protecting the availability of my organisation’s information. | 0.718 |  |  |
|  | 13 | The information security behaviours I am expected to perform make a difference to the security posture of my organisation. | 0.762 |  |  |
| Response benefits | 14 | I feel content if I comply with my organisation’s information security behaviours. | 0.892 | 0.750 | 0.923 |
|  | 15 | I feel satisfied if I comply with my organisation’s information security behaviours. | 0.921 |  |  |
|  | 16 | I feel accomplished if I comply with my organisation’s information security behaviours. | 0.858 |  |  |
|  | 17 | I feel fulfilled if I comply with my organisation’s information security behaviours. | 0.789 |  |  |
|  | 18 | I will receive a pay rise if I comply with my organisation’s information security behaviours. | Dropped |  |  |
|  | 19 | I will receive a promotion if I comply with my organisation’s information security behaviours. | Dropped |  |  |
| Cues to action | 20 | My organisation \_\_\_\_\_\_\_\_ distributes security awareness material to all employees using email newsletters and intranet articles. | 0.712 | 0.621 | 0.867 |
|  | 21 | My organisation \_\_\_\_\_\_\_\_ organises security talks/presentations for IT employees. | Dropped |  |  |
|  | 22 | My organisation constantly reminds me of my responsibility to practice information security behaviours. | 0.861 |  |  |
|  | 23 | My organisation ensures that information security policies are available to all employees. | 0.854 |  |  |
|  | 24 | My organisation’s information security policies are written in plain English and are easy to understand. | 0.712 |  |  |
| Social norms | 25 | Senior management thinks that I should comply with the organisation’s required information security behaviours. | Dropped | 0.788 | 0.881 |
|  | 26 | My manager thinks that I should comply with the organisation’s required information security behaviours. | 0.924 |  |  |
|  | 27 | My colleagues think that I should comply with the organisation’s required information security behaviours. | 0.849 |  |  |
| Detection | 28 | My organisation \_\_\_\_\_\_\_\_ monitors IT employee’s actions to detect violations of information security behaviours. | 0.675 | 0.634 | 0.772 |
|  | 29 | If I violate my organisation’s required information security behaviours I will be caught. | 0.901 |  |  |
|  | 30 | I would feel embarrassed if I was caught violating my organisation’s information security behaviours. | Dropped |  |  |
| Sanctions | 31 | My organisation disciplines IT employees who violate information security behaviours. | 0.695 | 0.511 | 0.807 |
|  | 32 | My organisation terminates employees who repeatedly violate information security behaviours. | 0.700 |  |  |
|  | 33 | I will be punished if I was caught violating my organisation’s information security behaviours. | 0.627 |  |  |
|  | 34 | I will receive written reprimand if I was caught violating my organisation’s information security behaviours. | 0.711 |  |  |
|  | 35 | I will receive verbal reprimand if I was caught violating my organisation’s information security behaviours. | Dropped |  |  |
|  | 36 | I will be demoted if I was caught violating my organisation’s information security behaviours. | 0.720 |  |  |
|  | 37 | I will incur non-monetary penalties if I was caught violating my organisation’s information security behaviours. | Dropped |  |  |
|  | 38 | I will incur monetary or non-monetary penalties if I was caught violating my organisation’s information security behaviours. | Dropped |  |  |
| Self-efficacy | 39\* | It is difficult for me to perform the information security behaviours required by my organisation. | -0.757 | 0.610 | 0.823 |
|  | 40 | I have the necessary skills to protect my organisation from information assets from security incidents. | Dropped |  |  |
|  | 41 | It is easy for me to perform the information security behaviours required by my organisation. | 0.883 |  |  |
|  | 42 | My organisation provides adequate training for me to perform the information security behaviours expected of me. | 0.691 |  |  |
| Intention | 43 | I intend to comply with the information security behaviours required by my organisation. | 0.967 | 0.940 | 0.979 |
|  | 44 | I intend to protect information and technology resources according to the information security behaviours required by my organisation. | 0.973 |  |  |
|  | 45 | I intend to carry out my information security responsibilities prescribed by my organisation when I use information and technology. | 0.968 |  |  |

\* = Reverse coded

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