Pursuant to Article 83, paragraph 3, Article 90, paragraph 4, Article 95, paragraph 3, Article 128, paragraph 2 and Article 130, paragraph 8 of the Law on Payment Services (RS Official Gazette, No 139/2014), as well as Article 15, paragraph 1 of the Law on the National Bank of Serbia (RS Official Gazette, Nos 72/2003, 55/2004, 85/2005 – other law, 44/2010, 76/2012, 106/2012, 14/2015 and 40/2015 – CC decision), the Executive Board of the National Bank of Serbia hereby issues the

DECISION

ON CAPITAL AND CAPITAL ADEQUACY OF PAYMENT AND ELECTRONIC MONEY INSTITUTIONS

I. INTRODUCTORY PROVISIONS

1. This Decision lays down elements and method of calculating initial capital of payment and electronic money institutions, method of calculating the amount of capital requirement which is uniformly applied to all payment institutions, manner of calculating capital and capital requirement of payment and electronic money institutions, capital adequacy of payment institutions relative to the total amount of granted loans, as well as manner and deadlines for reporting on capital and capital requirements of payment and electronic money institutions.

The provisions of this Decision shall apply to a payment institution and/or electronic money institution with head office in the Republic of Serbia which obtained license from the National Bank of Serbia to provide payment services as a payment institution (hereinafter: license to provide payment services), and/or license for electronic money issuance.

For the purpose of this Decision, institution shall imply both a payment institution and an electronic money institution, unless they are specifically designated.

II. INITIAL CAPITAL OF AN INSTITUTION

Initial capital of a payment institution

2. During the process of granting license to provide payment services, and on the day of the receipt of the decision of the National Bank of Serbia granting the license, the monetary portion of the initial capital of the undertaking applying for the license shall be no less than:

- 1) the dinar equivalent of EUR 20,000 at the official middle exchange rate if it intends to provide the payment service specified in Article 4, paragraph 1, point 6) of the Law on Payment Services (hereinafter: the Law) money remittance service;
- 2) the dinar equivalent of EUR 50,000 at the official middle exchange rate if it intends to provide the payment service specified in Article 4, paragraph 1, point 7) of the Law payment initiation service;
- 3) the dinar equivalent of EUR 125,000 at the official middle exchange rate if it intends to provide other payment services specified in Article 4, paragraph 1, points 1) to 5) of the Law.

If the payment institution intends to provide payment services that are subject to different amounts of initial capital under paragraph 1 of this Section, it shall be required to possess initial capital in the amount prescribed solely for the payment service, and/or payment services for which the highest amount of initial capital is required.

Initial capital of an electronic money institution

3. During the process of granting the license to issue electronic money and on the day of receiving the decision of the National Bank of Serbia granting this license, the initial capital of the undertaking applying for the license shall be no less than the dinar equivalent of EUR 350,000 at the official middle exchange rate.

Elements and method of calculation of initial capital of an institution

4. The initial capital of an institution shall consist of elements referred to in Section 11 hereof, and their amount shall be calculated in accordance with Section 12 hereof.

III. CAPITAL REQUIREMENTS FOR AN INSTITUTION

Capital requirement for a payment institution

5. The capital of a payment institution shall not be lower at any time than the amount of initial capital prescribed in Section 2 hereof or the amount of capital requirement calculated according to the method prescribed in Section 6 of this Decision, whichever amount is higher, except in the event that the payment institution provides only the payment service referred to in Article 4, paragraph 1, point 7) of the Law, when its capital shall not be lower than the amount of initial capital prescribed in Section 2, paragraph 1, point 2) hereof.

Only elements of core capital are used for the calculation of minimum capital of a payment institution relative to the amount of its initial capital, while in the calculation of the amount of capital of a payment institution relative to its capital requirement elements of supplementary capital of the institution are used as well.

6. A payment institution is required to calculate its capital requirement in accordance with the total amount of payment transactions method.

The requirement referred to in paragraph 1 hereof shall be calculated by multiplying the relevant amount of payment transactions referred to in paragraph 3 hereof with scaling factor K referred to in paragraph 5 of this Section.

The relevant amount of payment transactions shall consist of the sum of the following elements:

- 1) 4% slice of PV up to RSD 600 million;
- 2) 2.5% slice of PV above RSD 600 million up to RSD 1.2 billion:
 - 3) 1% slice of PV above RSD 1.2 billion up to RSD 12 billion;
 - 4) 0.5% slice of PV above RSD 12 billion up to RSD 30 billion;
 - 5) 0.25% slice of PV above RSD 30 billion.

PV (payment volume) implies one twelfth of the total amount of payment transactions executed by the payment institution in the preceding year.

The scaling factor K shall be:

1) 0.5 – where the payment institution provides only the payment services referred to in Article 4, paragraph 1, point 6) of the Law;

2) 1 – where the payment institution provides other payment services specified in Article 4, paragraph 1, points 1) to 5) of the Law.

The amount of capital requirements for a hybrid payment institution shall be calculated only for the part of business activities relating to the provision of payment services.

If the period in which a payment institution operates is not sufficiently long for PV calculation, the payment institution shall calculate PV by dividing the total amount of payment transactions after being issued a license with the number of full months from the date the license has been issued until the date the PV calculation is made.

7. The National Bank of Serbia may, by way of a decision, order a payment institution to maintain its own funds at the level up to 20% higher relative to the capital requirement calculated in accordance with Section 6 of this Decision.

The National Bank of Serbia may, by way of a decision, upon payment institution's application, approve a reduction in the institution's capital funds of up to 20% relative to capital requirement calculated in accordance with Section 6 hereof, but the payment institution's capital may not be lower than the amount of initial capital under Section 2 of this Decision.

The National Bank of Serbia shall issue decisions under paragraphs 1 and 2 of this Section taking into account the functioning of the governance system and the internal controls system, and in particular risk management of a payment institution, and data on losses incurred in the payment institution's operation.

Capital requirement for an electronic money institution

8. The capital of an electronic money institution shall not be lower at any time than the amount of initial capital prescribed in Section 3 hereof or the sum of capital requirements referred to in paragraphs 2 and 3 of this Section, whichever amount is higher.

If it provides payment services not directly related to the issuance of electronic money, an electronic money institution, in addition to having monetary portion of initial capital referred to in Section 3 hereof, shall calculate capital requirements for such

services by analogous application of the method specified in Section 6 hereof.

Capital requirement of an electronic money institution for the activity of issuing electronic money shall be at least 2% of average outstanding electronic money.

Average outstanding electronic money is the average amount of total financial liabilities relating to the issued electronic money at the end of each calendar day over the preceding six months. This average shall be calculated on the first day in the month for the previous six months, and shall be used to calculate capital requirement for the issuance of electronic money for that month.

If an electronic money institution provides payment services not directly linked to the issuance of electronic money or performs other activities specified in Article 116, paragraph 2, points 2) to 5) of the Law, and the amount of average outstanding electronic money is not known in advance, the National Bank of Serbia may, by way of a decision, approve the institution to use a representative portion assumed to be used for the purpose of electronic money issuance instead of the average outstanding electronic money as the basis for calculating capital requirement for the issuance of electronic money.

An electronic money institution shall submit a prior application to the National Bank of Serbia for an approval to use the representative portion assumed to be used for the purpose of electronic money issuance instead of the average outstanding electronic money as the basis for calculating capital requirement for the issuance of electronic money.

Along with the application referred to in paragraph 6 hereof, an electronic money institution shall submit to the National Bank of Serbia evidence that it is not possible to calculate the amount of average outstanding electronic money in advance and evidence that the representative portion referred to in that paragraph can be reasonably estimated on the basis of historical data.

Presentation of the method of calculation of that amount and/or method of processing historical data, data on the amount of monetary assets that the institution assumes will be used for electronic money issuance, as well as the method of calculating that amount, shall be considered as evidence that a representative portion can be reasonably estimated on the basis of historical data

referred to in paragraph 7 of this Section which the electronic money institution submits along with its application for issuance of permission or approval.

If the period over which it operates is not sufficiently long to calculate average outstanding electronic money, an electronic money institution may, instead of this average, use the projected amount of outstanding electronic money determined in its business plan as the basis for calculation of capital requirement for the issuance of electronic money, with the prior notification to the National Bank of Serbia which may require an adjustment of an unrealistically projected amount.

9. The National Bank of Serbia may, by way of a decision, order an electronic money institution to increase its capital up to 20% relative to capital requirement calculated in accordance with Section 8 hereof.

The National Bank of Serbia may, by way of a decision, upon electronic money institution's application, approve a reduction in capital of that institution up to 20% relative to capital requirement calculated in accordance with Section 8 hereof, but the electronic money institution's capital may not be lower than the amount of initial capital under Section 4 of this Decision.

The National Bank of Serbia shall issue decisions under paragraphs 1 and 2 of this Section taking into account the functioning of the governance system and the internal controls system, and in particular risk management of an electronic money institution, and data on losses incurred in that institution's operation.

IV. CALCULATION OF CAPITAL AND CAPITAL ADEQUACY

Capital of an institution

10. The capital of an institution shall be the sum of its core capital and supplementary capital less deductibles referred to in Section 24 hereof.

Core capital

11. The core capital of an institution shall consist of the following elements, less deductibles referred to in Section 15 of this Decision:

- 1) paid in share capital, excluding cumulative preferential shares (for a payment institution operating in the form of a joint stock company), or paid in holdings (for a payment institution operating in other legal forms);
 - 2) reserves from profit (legal, statutory and other reserves);
 - 3) profit of the institution.

Elements referred to in paragraph 1 above shall be included in core capital if they fulfil the following conditions:

- they do not have a specified maturity and cannot be withdrawn;
- they can be used unconditionally, fully and without delay for the coverage of risks or losses;
- in the case of opening of bankruptcy proceedings or liquidation proceedings over the institution, they are available fully and without limitation for the coverage of losses of the institution concerned after liabilities to all other creditors have been satisfied;
- the institution is entitled not to pay dividends or to restrict their payment;
- they are reduced by all potential tax liabilities and anticipated costs.
- 12. An institution shall include in its core capital within the meaning of Section 11, paragraph 1, point 1) of this Decision the share capital subscribed and paid in against issued ordinary and preferential shares, excluding cumulative preferential shares (for an institution operating in the form of a joint stock company), and the capital subscribed and paid in for subscribed and brought-in holdings (for an institution operating in other legal forms), in the amount of:
- 1) par value of paid-in ordinary and preferential shares, and/or the value of paid-in and brought-in holdings, respectively;
- 2) relevant share premium, i.e. amount paid above par value of subscribed ordinary and preferential shares, and/or the amount paid above the value of paid-in and brought-in holdings, respectively.

13. Reserves from profit which the institution includes in core capital shall include all types of the institution's reserves established on the basis of the decision of the institution's general meeting or another competent body or person exercising the powers of the general meeting (hereinafter: institution's general meeting), and debited to the profit after taxation.

The reserves amount shall also include capital gains realized through acquisition and sale of own shares/holdings of the institution, while capital loss incurred on the same ground shall be deducted from the reserves amount.

- 14. Profit of the institution included in core capital shall be made up of:
- 1) retained earnings from previous years free of any future liabilities, to be allocated to core capital according to the decision of the institution's general meeting;
- 2) profit of the current year, if the National Bank of Serbia granted prior approval to the institution to include that profit in the core capital and, on the basis of submitted documentation, determined that the following conditions are met:
 - the amount of profit is confirmed by an external auditor,
- the amount of profit is reduced by anticipated amount of income tax and all other liabilities payable from profit and anticipated costs (liabilities for dividends, other participations in profit distribution, etc.),
- the institution's general meeting decided to allocate profit in core capital and the amount of the institution's current year profit that is included in core capital does not exceed the amount determined on the basis of that decision.
 - 15. Deductibles from core capital shall include:
 - 1) losses from previous years;
 - 2) loss of the current year;
- 3) intangible assets, including goodwill reduced by deferred tax liabilities which would cease to exist in case of impairment or derecognition of intangible assets in line with International Financial

Reporting Standards, and/or International Accounting Standards (hereinafter: IFRS/IAS);

- 4) acquired own ordinary and preferential shares, excluding cumulative preferential shares (for an institution operating in the form of a joint stock company), and/or acquired own holdings (for an institution operating in other legal forms) in the amount of their book value (par value increased by share premium);
- 5) ordinary and preferential shares, excluding cumulative preferential shares (for an institution operating in the form of a joint stock company), and/or holdings (for an institution operating in other legal forms) which the institution concerned received in pledge in the amount equal to the value of receivables secured by pledge of shares, and/or holdings, or par value of shares or holdings increased by relevant share premium, whichever is lower;
 - 6) regulatory value adjustment according to IFRS/IAS.

Regulatory value adjustments referred to in paragraph 1, point 6) above shall include:

- 1) unrealised losses in respect of securities available for sale;
- 2) other net negative revaluation reserves that do not refer to deductibles from core capital or elements included in the institution's supplementary capital;
- 3) gains on institution's liabilities measured at fair value reduced due to the change in the institution's credit rating.

Supplementary capital

- 16. The supplementary capital of an institution shall consist of the following elements, less deductibles referred to in Section 22 of this Decision:
- 1) paid in share capital in respect of cumulative preferential shares of an institution operating in the form of a joint stock company;
 - 2) part of positive revaluation reserves of the institution;
 - 3) hybrid capital instruments;
 - 4) subordinated liabilities.

- 17. Cumulative preferential shares shall be included in the supplementary capital of an institution operating in the form of a joint stock company if they fulfil the following requirements:
- 1) they do not have a specified maturity and cannot be withdrawn;
- 2) they can be used unconditionally, fully and without delay for the coverage of losses in the course of the regular business operation of the institution;
- 3) the institution has the right to postpone the payment of dividends;
- 4) in the event of bankruptcy or liquidation of the institution, the right of owners of these shares to participation in the distribution of bankruptcy/liquidation estate is subordinated to the right of other creditors of the institution and owners of other capital instruments other than those included in core capital;
- 5) they are reduced by all potential tax liabilities and anticipated costs.

An institution operating in the form of a joint stock company shall include in its supplementary capital the share capital subscribed and paid in against issued cumulative preferential shares, in the amount of:

- 1) par value of paid in cumulative preferential shares;
- 2) relevant share premium, i.e. amount paid above par value of subscribed cumulative preferential shares.
- 18. Supplementary capital of an institution shall include the part of positive revaluation reserves created on the basis of the effects of changes in fair value of fixed assets, securities and other assets which are, in accordance with IFRS/IAS, credited to these reserves, the reserves being reduced by the effects of tax liabilities.
- 19. Hybrid capital instruments shall be financial instruments issued by the institution which have the characteristics of equity and debt financial instruments. The institution shall include in supplementary capital those hybrid instruments that fulfil the following conditions:

- 1) the instrument was issued by the institution with an intention to have it included in supplementary capital;
- 2) the issuance of the instrument has not been financed, either directly or indirectly, by the institution;
 - 3) they are fully paid-up;
- 4) they do not have contractually determined maturity and/or have determined maturity that is not less than 30 years from the date of payment;
- 5) repayment to the owners, and/or creditors or repurchase by the institution are not possible before the specified maturity date, except in the case of conversion of these instruments into shares of the institution other than cumulative preferential shares and/or holdings of the institution;
- 6) they can be used unconditionally, fully and without delay for the coverage of losses in the course of the regular business operation of the institution, as well as in bankruptcy proceedings or liquidation proceedings of the institution;
- 7) in the event of bankruptcy or liquidation of the institution, liabilities under these instruments may be settled only after the settlement of all other liabilities of the institution, including subordinated liabilities, except those included in core capital;
- 8) they are not backed by any collateral (guarantee, mortgage, etc.) issued by the institution or by its related party;
- 9) the institution may not pay interest, fees or other yields on these instruments if its capital falls below the level prescribed by this Decision;
- 10) the institution may defer payment of interest, fees and other yields on these instruments;
- 11) if the institution, within 90 days from the date when it has been established that its capital fell below the amount representing 75% of the prescribed level, does not increase its capital to the prescribed level, the institution shall convert that instrument into shares and/or holdings of the institution which are included in its core capital;

12) the legal basis regulating the relations between the owner of a hybrid instrument and the institution (e.g. contract, prospectus) must be concluded in writing and must contain all conditions laid down in this paragraph.

The institution shall include in the calculation of supplementary capital hybrid instruments of capital which mature in less than twelve months.

If it has been agreed that the institution pays its obligations under a hybrid instrument in instalments, that instrument may be treated as an element of supplementary capital only if the first instalment falls due for payment within a period of more than five years, counting from the date of payment.

- 20. Subordinated liabilities of the institution shall be included in its supplementary capital if they meet the following conditions:
- 1) the liability was agreed by the institution with an intention to have that amount included in supplementary capital;
 - 2) they are fully paid-up;
- 3) their agreed maturity is determined in advance and is at least five years from the date of payment;
- 4) repayment to creditors, repurchase of these liabilities or another way of recovery of these funds is not possible before the agreed maturity date, except in the following cases:
- conversion of these liabilities into shares of the institution other than cumulative preferential shares and/or holdings of the institution;
- with the approval of the National Bank of Serbia, provided that the institution has previously issued other elements of capital which fully substitute liabilities the payment of which is intended, and/or provided that the institution proves that the payment of debt does not worsen its financial condition and does not diminish its capacity to meet its capital requirements increased by 20%;
- 5) they are available for the coverage of losses only in the event of bankruptcy or liquidation of the institution, and/or they are not available for coverage of losses incurred in the course of regular operation of the institution;

- 6) in the event of bankruptcy or liquidation of the institution, these liabilities may be settled only after the settlement of all other non-subordinated obligations, but before the shareholders (if it operates as a joint stock company) or members (if it operates in another legal form) and owners of hybrid instruments issued by the institution;
- 7) they are not backed by any collateral (guarantee, mortgage, etc.) issued by the institution or by its related party;
- 8) the institution's creditor is not at the same time the institution's borrower in respect of its subordinated claim;
- 9) the legal basis regulating the relations between the creditor and the institution (e.g. contract, prospectus) must be concluded in writing and must contain all conditions laid down in this paragraph.

If it has been agreed that the institution pays its subordinated liability in instalments, that liability may be treated as an element of supplementary capital only if the first instalment falls due for payment within a period of more than five years, counting from the date of payment.

The amount of subordinated liability of the institution included in supplementary capital shall be reduced by 20% per year over the last five years before maturity of that liability and hence subordinated liabilities shall not be included in supplementary capital in the last year before their maturity.

- 21. A hybrid instrument or a subordinated liability may be included in the calculation of supplementary capital only if the institution notified the National Bank of Serbia thereof at least 30 days prior to this inclusion and supported the notification with the following documentation:
- 1) documentation relating to issuance of these instruments (contract, prospectus, etc.) and/or creation of this liability, as well as other documentation evidencing that the conditions referred to in Section 19, paragraph 1, or Section 20, paragraph 1 of this Decision are met;
- 2) presentation showing that the conditions referred to in point 1) of this paragraph are met, with reference to relevant documents;

- 3) description of accounting treatment of this instrument and/or this liability;
- 4) calculation of the amount of capital and capital requirements on the last day of the month preceding the month when the notification is submitted, excluding hybrid instrument and/or subordinated liability;
- 5) projected calculation of the amount of capital and capital requirements for the following three years, including the hybrid instrument and/or subordinated liability.
- If the institution submitted incomplete or inadequate documentation referred to in paragraph 1 above, the National Bank of Serbia may, within 20 days from submission of notification and/or documentation referred to in that paragraph, request the institution to submit proper documentation.

The deadline referred to in paragraph 1 above shall run from the date proper documentation referred to in that paragraph has been submitted.

In the event of changes in conditions referred to in Section 19, paragraph 1 and/or Section 20, paragraph 1 of this Decision, and particularly in the event of any change in the legal basis referred to in Section 19, paragraph 1, point 12), and/or Section 20, paragraph 1, point 9) of this Decision, the institution shall notify the National Bank of Serbia thereof without delay and submit relevant documentation relating to these changes. If these conditions are no longer fulfilled, the institution shall be required to exclude the hybrid instrument and/or subordinated liability from the calculation of capital.

- 22. Deductibles from supplementary capital shall include:
- 1) acquired own cumulative preferential shares in the amount of their book value, for institutions operating in the form of a joint stock company;
- 2) own cumulative preferential shares and/or own holdings which the institution concerned received in pledge in the amount equal to the value of receivables secured by pledge of shares, and/or holdings, or par value of shares and/or holdings increased by relevant share premium, whichever of the two values is lower;

3) receivables in respect of balance-sheet assets and offbalance sheet items of the institution secured by a hybrid instrument or subordinated liability of the institution up to the amount in which these instruments or liabilities are included in supplementary capital.

Restrictions on certain elements of capital

23. In calculating its capital, an institution shall be required to observe the restriction that supplementary capital may only be equal to or lower than a third of core capital.

Deductibles from capital

- 24. Deductibles from capital of the institution shall include the following:
- 1) direct or indirect investment in another payment institution, electronic money institution, bank and other financial sector entities that exceed 10% of the capital of each of these institutions and/or entities;
- 2) investment in hybrid instruments and subordinated liabilities of other payment institutions, electronic money institutions and financial sector entities in which the institution has direct or indirect investment that exceeds 10% of the capital of each such institution and/or entity.
- 3) total amount of direct and indirect investment in another payment institution, electronic money institution, bank and other financial sector entity in the amount of up to 10% of their capital, as well as investment in their hybrid instruments and subordinated liabilities that exceeds 10% of the sum of core and supplementary capital of the institution for which the calculation of capital is made.
- 25. Deductibles referred to in Section 24 of this Decision shall be deducted from core and supplementary capital of the institution as follows:
 - 50% of their total amount shall be deducted from core capital;
- 50% of their total amount shall be deducted from supplementary capital.

By way of derogation from paragraph 1 above, if 50% of the total amount of deductibles exceeds the supplementary capital of

the institution, the difference above the amount of supplementary capital shall be deducted from core capital.

If the value of deductibles referred to in Section 24 of this Decision has been decreased, the institution shall be required to present these items in the value of estimated recoverable amount.

The institution shall be required to reduce capital by deductibles only after fulfilling the restrictions referred to in Section 23 of this Decision.

26. Investments in the capital of other institutions, banks and other financial sector entities that are of temporary nature and are a consequence of the provision of financial assistance for the purpose of resolution or reorganisation of these entities shall not be deductible from the institution's capital.

An institution shall without delay notify the National Bank of Serbia of the investments referred to in paragraph 1 above and supply all the necessary documentation.

Prohibition of multiple use of elements of capital

27. When calculating capital in accordance with this Decision, the institution may not use items that are used for the calculation of capital of another institution, bank and a financial sector entity belonging to the same group of undertakings as that institution.

The prohibition stipulated in paragraph 1 above shall also apply to hybrid payment institutions.

Capital adequacy of a payment institution relative to the total amount of granted loans

28. The institution granting loans in connection with the provision of payment services on the basis of Articles 95 and 116 of the Law shall be required to ensure that its capital at any time is no less than the total amount of loans it granted.

V. REPORTING ON CAPITAL AND CAPITAL REQUIREMENTS

- 29. An institution shall be required to submit to the National Bank of Serbia the following reports relating to capital and capital requirements of the institution and capital adequacy of the institution relative to the total amount of granted loans:
 - Report on capital on KAP-ZPU form;

- Report on capital requirements and capital adequacy ratio of a payment institution – on PAK-PI form;
- Report on capital requirements and capital adequacy ratio of an electronic money institution – on PAK-IEN form.

The content of the forms referred to in this Section is laid down in Annex 1 to this Decision which is integral thereto.

- 30. The institution shall submit the reports referred to in Section 29 hereof quarterly to the National Bank of Serbia as follows:
- 1) reports for Q1, with data as at 31 March of the current yearby no later than 20 April of the current year;
- 2) reports for Q2, with data as at 30 June of the current year by no later than 20 July of the current year;
- 3) reports for Q3, with data as at 30 September of the current year by no later than 20 October of the current year;
- 4) reports for Q4, with data as at 31 December of the current year by no later than 5 March of the following year.
- 31. By way of derogation from Section 30 of this Decision, an institution shall, at the request of the National Bank of Serbia, compile reports with the data as at the date to be designated by the National Bank of Serbia and submit them by the date to be specified by the National Bank of Serbia.
- 32. An institution shall submit the reports referred to herein as an electronic message, in the format and manner prescribed by the specific guidelines on electronic submission of data to the National Bank of Serbia.

The institution shall disclose data in the reports hereunder fully and accurately, in compliance with the regulations of the National Bank of Serbia.

VI. FINAL PROVISION

33. This Decision shall enter into force on the eighth day from its publication in the RS Official Gazette and shall apply as of 1 October 2015.

NBS Executive Board No 53 19 June 2015 B e I g r a d e Chair
of the Executive Board of the
National Bank of Serbia
Governor
of the National Bank of Serbia

Jorgovanka Tabaković, PhD